DYKES ON IRISES

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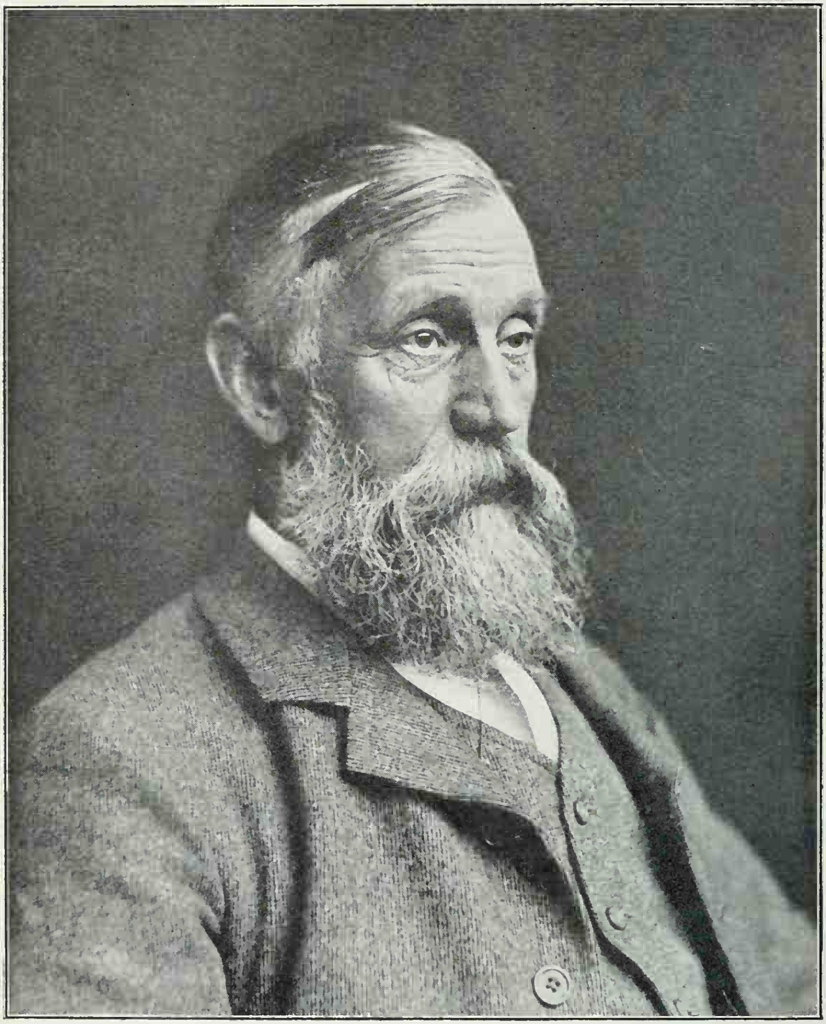

This book is dedicated to the memory of
SIR MICHAEL FOSTER
who as pioneer in the collection and cultivation of
Irises inspired the writer of these articles and made
his subsequent work possible.

DYKES ON IRISES

A Reprint of the contributions
of the late W. R. Dykes, L-es-L.,
to various journals and periodicals
during the last 20 years
of his life

COMPILED AND EDITED BY

GEORGE DILLISTONE

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THE PRESIDENT AND COUNCIL OF THE ROYAL HORTICULTURAL SOCIETY for permission to reprint articles from the Society's Journal.

The proprietors and editors of :—

"*The Times*"
"*Country Life*"
"*The Garden*"
"*The Gardeners' Chronicle*"
"*Garden Life*"
"*Revue Horticole*" (France)

and such other publications in which contributions have appeared, and which are individually acknowledged in the reprint, for waiving their copyright and thus so courteously making it possible for the collection to be published complete.

To all the above, and others who have helped me in various ways, I would add my personal expression of thanks.

EDITOR.

EDITOR'S NOTE.

In passing the final proofs of the following pages, I must confess to an acute sense of relief that a task which has at times appeared almost impossible is completed. It may be, indeed it is probable, that a few notes written by Mr. Dykes have escaped my net. That net has however been spread very widely, and nothing that has come into it has been discarded without examination. A very few notes and articles have been intentionally omitted—

(1) Because they were merely show reports on exhibits of irises, where the particular species or variety is dealt with more satisfactorily elsewhere.

(2) It is obvious that such a prolific writer as Mr. Dykes would on a few occasions in different journals say much the same thing. Only articles that appeared to me to be repetitive (and I think only five of these) have been intentionally omitted.

In preparing the articles for reprint, I have made a few alterations of a minor nature where the original wording referred to something that was quite intelligible in the original article, but outside the scope of a book. It has not been found possible to reproduce all the original illustrations and this alone necessitated some slight alteration here and there. No interpolations have been made, nor has a single word been altered that has in any way destroyed the sense and the original intention of the author.

The arrangement of the book has occasioned me some concern. It would have been easy to arrange the articles in date order, or alphabetically. I have, however, preferred to attempt something in the nature of grouping, by placing together first those articles of general interest, secondly, those that dealt more particularly with species and varieties and lastly those miscellaneous notes a little difficult to place in the preceding groups. One or two items that came in late after the first portion was in print had to be included in the third group. I hope the effort to provide a complete index will overcome any little difficulties of reference which the arrangement adopted may cause.

To me is given that liberal sense of satisfaction that it has been my lot to contribute an abiding stone to a monument to the memory of the author, who himself laid the foundation of that monument during his lifetime.

George Dillistone.

V.

WILLIAM RICKATSON DYKES.

Mr. Dykes was born in 1877, and educated at the City of London School, at Wadham College, and at the Sorbonne in Paris. He was a master at Charterhouse for sixteen years. In 1920 he was appointed Secretary of the Royal Horticultural Society on the retirement of the Rev. W. Wilks.

It was his contact with Sir Michael Foster that excited his interest in the Iris and from the inspiration thus received he progressed step by step until he became the foremost authority of his day on the genus. Indeed so thoroughly and efficiently did he fill the niche that fate designed for him that his work is likely to remain for all time an achievement that can never be superseded, probably never equalled so far as one genus is concerned.

His death was a sad loss to all who knew him. His post as Secretary of the Royal Horticultural Society was no sinecure, and he performed all his hundred and one duties with a calm energy and a strength of purpose that did more towards making the R.H.S. the great Society it is than many people imagine. He had an extraordinary capacity for detail in anything in which he was interested, as noticeable in his work at Vincent Square as in his investigations into irises, tulips and crocuses. Unlike many investigators, he was both scientific and practical, and he knew his plants not only as herbarium specimens, but also as denizens of the garden.

With the popularity of gardening has grown up almost hand in hand that of the iris, and it is due to the pioneers like Sir Michael Foster and the late Mr. Dykes that the genus has attained its present high standing. Mr. Dykes' labours have not been in vain, and his name will for ever be closely associated with the *fleur de luce* and the many fine forms and varieties which he has presented to the horticultural world.

In all sections of the genus the influence of his hand is to be found. He worked hard for some considerable time at the Apogon irises, crossing them not only with one another, but also with the bearded kinds. Among the pallida varieties he effected great improvements. His extensive list of introductions to the iris family is, indeed, an imposing one, and the result of years of patient study and research.

His work on the genus did not finish with the growing of the plants. He has left to the gardening world contributions to literature which, like many of his varieties, will remain as standard works for a number of years. His first volume on irises was a small one published in the Present-Day Gardening Series in 1911. This was followed by his great work in the form of an admirable scientific monograph on "*The Genus Iris*," which is now recognised as the standard work on the family throughout the world. This was followed by "*A Handbook of Garden Irises*," and already the value of this volume has been widely recognised by all gardeners, filled as it is with many practical hints on the culture of the iris, the outcome of his many years' experience with the flower.

From 1906 to the date of his death he was a frequent contributor to all the principal horticultural journals of the day. In 1907 we find him expressing his gratification that a certain journal had "found *parts* of my letter of sufficient interest to reproduce." A few years later there was not a word that he had to say that was not scanned eagerly by the enthusiast and valued by the editors to whom he sent his contributions as that of a man who wrote only of what he knew, and knew of what he had written. It is a curious fact that his articles in the press present examples of his attainments quite different from his published books. As works of reference his books are uniquely authoritative but are more valued for their scientific accuracy than as readable literature. His contributions to the press were on a different plane. They appeal to the mass, the beginner, amateur and gardener on more general lines. It is for this reason that the Iris Society decided to reprint them in the interest of all garden lovers.

From the foregoing it might appear that his efforts and attentions were all centred on the iris, but this was not so. His outlook was wide and his interests catholic. In recent years he devoted much of his time to the genera Tulip and Crocus, and had he lived there is no doubt that the gardening world would have benefited greatly by his painstaking research and wide knowledge. In other branches of horticulture he was equally versatile, combining to a marked degree theoretical and scientific knowledge with a rare intuition of the requirements of the practical man.

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IRISES

IRISES

(*" The Times "—July 6th,* 1907.)

Everyone knows the tall purple flag or Iris germanica, but it is hardly yet a matter of common knowledge that it is possible, at least in the south of England, to have irises of one sort or another in flower during ten months of the year. Moreover, even in the two remaining months of August and September, it is by no means unusual to find a few stray flowers among a number of plants. And yet, when we realise that there are between 150 and 200 known species of iris, coming from all parts of the northern temperate zone, from Siberia and Labrador to Arabia and even as far south as Hong-kong, it should not surprise us to find that irises can be had in flower during so many months of the year.

The flowering season begins in October with alata and Vartani. The former has a comparatively large flower some 4in. in diameter, and it varies in colour from dark blue to a pure white. Vartani is smaller, usually a slaty blue, and its chief merit is that it possesses a strong scent of almonds. Another point of interest is the fact that it comes from the neighbourhood of Nazareth. While these two plants are still in bloom, a few hours of sunshine will bring into flower the lovely Algerian Iris, stylosa or unguicularis, which in a warm corner facing south, in soil that is neither too rich nor deficient in lime, will send up its flowers at intervals all through the winter months and on into April. The buds should be picked just before they burst and brought indoors to open, for rough weather soon spoils the blooms. In the opening days of January we may look for the first of the numerous relatives of the well-known violet-coloured Iris reticulata. The procession is headed by histrio, the gaudily painted actor, closely followed by the tiny Iris Bakeriana with its pale bluish-white flowers with deep velvety violet tips. Then, in the bleak days of February, when to garden at all is an act of faith, we are cheered by the sight of the fat buds of histrioides and reticulata Krelagei pushing up between each pair of characteristic quadrangular leaves and by the quaintness and neatness of the tiny deep yellow Iris Danfordiae, which stands only two, or at most three, inches high and can only boast of one single leaf. Iris reticulata itself, deep violet with a golden streak, does not usually open until the end of the month or the beginning of March, but it atones for its delay by its brilliant colour and its sweet scent of violets. The home of the family is in Asia Minor, and its members do not take kindly to every new abode. They seem to prefer a soil, which, while fairly rich in humus is yet well drained and, therefore, comparatively warm in winter. They are best left undisturbed, but if they must be moved, they should be left in the ground until the leaves have entirely withered away. They are then best stored in dry sand and planted again early in the autumn, in September or October.

All the irises which we have noticed so far, with the exception of alata and stylosa, produce small bulbs with netted coats, from which the type, reticulata, takes its name. But the class to which alata belongs—namely, the Juno Irises—have numerous roots, like small radishes attached to the bulb. These curious appurtenances contain stores of food, which the plants consume when they flower, and their last task in preparation for their summer sleep is to store up food for the next year's flowers by throwing out new roots from the base of the bulb. Iris alata is a native of the shores of the Western Mediterranean, and is especially plentiful in Sicily where it forms wonderful patches of colour along the banks of the streams on Mount Etna. In the East its nearest relative is Iris palaestina, which opens its curious bluish-green flowers in February and March. Together with this iris come the various varieties of Iris persica, which has been grown in England for several centuries, but which is by no means as common or as well known as it deserves to be. Its large, brightly-coloured flowers are thrown up soon after the leaves begin to push their way through the surface of the ground. The colours are chiefly shades of white, sea-green, blue and steely-grey, and the flowers stand only a few inches high. Taller than persica, and far more gaudy, is the rarer Rosenbachiana, standing eight or more inches high, with brilliant flowers of various combinations of white, gold and crimson.

To this same family of Juno Irises belong several species as yet by no means common in gardens. They are all of them hardy in the sense that the bulbs and leaves are neither killed nor cut down by frost, but flowering as they do in February, March and April, the blooms are all the more perfect if given the protection of hand-lights or a cold frame. The home of all the species is in Central Asia and the bulbs need a thorough ripening in summer to enable them to flower well the following year. In a warm, sandy soil these irises will live for years and flower fairly well when left entirely alone, and even when overgrown in summer by herbaceous plants. But in less favoured situations it is advisable either to lift the bulbs and store them in dry sand in a greenhouse or frame or dry shed until early autumn, or else to cover the plants with glass during the summer months. If these irises must be taken up, it is important, and at the same time somewhat difficult, to preserve the curious fleshy roots, which are loosely attached to the bulb. When they are planted, a warm sheltered spot should be chosen, and they are all the better if a layer of old, decayed cow manure be placed well below the bulbs, so that the long roots can find their way down to it. A heavy soil is sometimes advised for them, but they certainly do well in light porous sand. All these irises have deeply channelled, bright green leaves with a shiny surface and in some cases a narrow white margin. The flowers issue from the axils of the leaves, which are arranged alternately on opposite sides of the stem.

The first to flower of these taller Juno Irises is usually sindjarensis, towards the end of February or later. The colour varies from a good deep blue through slaty-blue to pure white. It grows 18in. high and produces as many as seven flowers on a stem. Next come orchioides and its varieties alba, coerulea and sulphurea. The type has small flowers of a good deep yellow, while its varieties, as described by their names, are far more charming. In nearly every case four delicate parallel lines of olive green run along the shaft of the fall and there is usually a signal patch, distinct in colour from that of the rest of the blade of the fall. This signal patch, which is perhaps nowhere more distinct than in the Oncocyclus Irises, is usually a brightly-coloured spot in the centre of the blade of the fall, by which the insects are attracted to the entrance of the passage or tunnel at the far end of which lies the nectar which they seek. The pollen-bearing anther lies along the roof of the tunnel, and covers the back of the intruding insect with pollen, which is scraped off by the lip of the stigma in the next flower it visits, for the stigmatic lip projects downwards at the entrance of the tunnel. But to return to the Juno Irises. While orchioides is still in flower at the latter half of March, the rare Wilmottiana, with its delicate lavender flowers, blotched with white, and bucharica, with large white flowers having the blades of the falls coloured a brilliant yellow, come into bloom. These are followed by warleyensis, which has violet-purple flowers with orange crests. Iris assyriaca is a plant closely allied to sindjarensis, and has large white flowers ; while caucasica, fumosa, and Tubergeniana have curious semi-transparent yellowish flowers of varying shades.

The Juno Irises remain in flower until the end of April, and in the same month the earliest of the dwarf flags begin to bloom. Leaving the latter for consideration with the rest of the Pogoniris section, we will pass on to the Oncocyclus and Regelia families. These will never, it is to be feared, flower freely enough in our trying climate to form great patches of colour, but they are at once the pride and despair of the true iris lover, who sees in a few flowers of Lortetii or Gatesii ample reward for all the trouble that he has taken in their cultivation, and their cultivation is a real difficulty in this country. Even the late Sir Michael Foster, who devoted so much attention to this group of irises, owned that after 25 years he was still uncertain as to the manner in which they should be grown. All his care and science could not prevent their dying suddenly when apparently in the bloom of health, and the truth probably is that, even in their native homes, the individual plants are short-lived. In attempting to cultivate them in England we must aim at reproducing, in some degree, the conditions under which they grow in their homes in Syria and Central Asia, where they are baked by the sun in summer and kept dry in winter beneath frozen snow. As we might suppose, dry cold seems powerless to harm the rhizomes, but damp mild weather in autumn and winter is fatal to them, for they begin to shoot up, and the young shoots are soon cut down by frost, while the rhizomes get sodden and rot. In summer they need a thorough ripening, which may be obtained either by covering the beds with lights or by taking up the rhizomes when the foliage withers in July and storing them in sand in a dry, warm and preferably sunny place, until the second week in October. If planted earlier they are apt to start into growth too soon and suffer in the winter and, if later, the roots will not seize hold of the ground. Roots that are firm should not be trimmed from the rhizomes, for they soon throw out fresh fibres when they are replanted. The beds should be made convex, and so arranged as to throw off moisture rapidly, and the protection of lights in wet weather is beneficial. Sharp drainage is essential.

On the question of soil for these irises there has been much discussion. Their native soil is rich in lime, and they have certainly succeeded best in chalky soils in England, and a considerable admixture of chalk or lime would therefore seem advisable. Lime in the form of bone meal is, however, to be avoided for it is apt to make the soil sour. Manure as a top dressing is harmful, for it tends to rot the growths, but old cow manure placed about a foot below the surface provides the nourishment needed by plants which make their growth and flower rapidly.

If the cultivation of these plants is difficult the reward of success is great, for these flowers are some of the most wonderful that we can grow in our gardens. The colours, it is true, are not clear in most cases, but are almost all the products of lines and spots of one colour upon a groundwork of another and lighter colour. Thus, Gatesii, the largest-flowered species of all, has the purple lines and points so completely covering the creamy-white ground that the effect produced at a short distance is that of a soft grey. Lortetii has immense standards of creamy-white, faintly lined with reddish-purple, so that their whole effect is pinkish, while the falls, which seem almost to hug the stem with delight in the beauty of their standards, are more boldly dotted with crimson on a creamy ground, the signal patch being a solid blotch of crimson-brown. Perhaps the best known and easiest to grow is susiana, the Mourning Iris, with its network of black lines and dots on a greyish ground. Iberica has an extraordinarily large flower for the size of the plant, the standards being white veined with purple, while the falls are dark brown. Paradoxa deserves its name for, whereas in most irises the standards are smaller than the falls, in this case the falls are merely narrow straps covered as it were with black velvet, while the standards are large and circular, veined with deep blue on a bluish-white ground. Of the other species the clear yellow urmiensis is most distinct, so that one wishes that it were not so rare.

The closely-allied Regelia species seem to be less apt to disappear and die out, provided that the rhizomes are well ripened in summer. They are also more floriferous and have the additional merit of producing two flowers on a stem, while the Oncocyclus rarely produce more than one. The chief species of the family are Korolkowi with conspicuous veinings of purple or chocolate on a pale whitish ground, vaga and Leichtlini both of which bear flowers with wavy edges of an indescribable rosy-brown shot with blue. They are distinguished by their beards, that of vaga being bright yellow, while that of Leichtlini is blue.

We do not yet, unfortunately, understand the mysteries of hybridisation, but its results are in many cases startling. For instance, these Regelia flowers, when crossed with pollen of Oncocyclus species, give rise to plants which are of much easier cultivation than either of their parents. In most cases they retain the shape, and to a large extent, the colouring of the Oncocyclus flowers, while they take after the Regelias in being more floriferous and in producing two flowers on each stem. These Regelio-Cyclus hybrids are still rare and expensive as irises go, but we may hope that in a few years they will become as plentiful as they are beautiful.

Last week we spoke of those bulbous irises which flower in winter and spring and of the oncocyclus and regelia families which succeed them. But even before these latter are in flower we may expect some blooms of the earliest of the great class of Pogon or bearded irises, of which the common purple flag (Germanica typica) is the well-known type. The family is very widely distributed, examples of it being found in Spain, while in the East it extends as far as Nepal and possibly into the Shan States in Burma. All its members possess a root-stock or rhizome which lies on or near the surface and from which the real root fibres run down into the soil.

The earliest to flower is usually some form of pumila, which opens its first buds in early April. The colours are very various, ranging from yellow and white through pale blue, green, brown and claret to purple and violet. Almost all are extremely floriferous, and when the rhizomes have been thoroughly ripened in the previous summer they will produce as many as 30 blooms in a square foot. This is especially the case with the charming pumila coerulea which might well be used more often than it is to form dwarf edgings. The growth is compact and practically evergreen, and the plants are not fastidious as to soil, provided that it is not too damp, nor the position too shady. Most of the forms to be found in catalogues are hybrids, either of natural or of garden origin, ot various dwarf species native to Southern Europe as far east as the Crimea. Iris pumila itself comes from Austria and from the mountainous regions lying to the south-east, and varies somewhat with the locality. The slightly larger pseudo-pumila is common in Sicily, while from Switzerland comes the greenish-yellow, sweetly-scented virescens. Italy sent us chamaeiris several centuries ago, for it found a place in Bacon's garden, while a handsome flower of a deep rich yellow shows its origin in its name bosniaca.

As the month of April advances, so do the irises grow in height. The early pumila are not more than 6in. tall, while virescens is as much as a foot. Taller than this again is the May-flowering Statellae. Once May is reached an iris garden should be one continuous blaze ot colour, for the common purple flag is closely followed by the innumerable forms and hybrids which are loosely known as German irises. Closely related to the type, and probably only local varieties of it, are several forms of which Amas or macrantha is perhaps the best, while other good forms are Purple King, Crimson King, Fontarabie and asiatica. With these true germanicas, there flowers also the white florentina, whose dried rhizomes provide the violet-scented orris-root. Then, without any break, come the many-coloured hybrids of such wild species as variegata, pallida, neglecta, plicata, and sambucina—if, indeed, we may be sure that even some of these are not themselves hybrids. All these are natives of South-eastern Europe and Western Asia, and it is interesting to attempt to trace the parentage of their numerous progeny. For instance, variegata gives us flowers with yellow standards and usually dark falls, although even of this there is a charming pure white variety, called Innocenza ; pallida, with its pale glaucous leaves and papery spathes tends to produce self-coloured flowers, such as the pink Queen of May, or the pale lilac variety from Dalmatia. Neglecta gives us flowers of which the standards range from lilac to purple, while the falls are usually darker, and even sometimes black, as in Black Prince, one of the best of all the German flags. Plicata has white flowers, of which the edges are veined with lilac-purple, and this colouring is characteristic of its offspring, of which Madame Chereau is a good example, while to sambucina we owe the scent of elder-flowers, from which it takes its name, and the gold dust which seems to cover the standards of such flowers as Jacquiniana, when seen in bright sunshine. These flags are best planted six weeks after flowering and should be given a sunny position.

The largest of all the Iris families is that of the Apogons, or beardless irises. The members of this family are very widely distributed, being found in Europe, Asia, Africa and America. Our two native English irises, the yellow water-flag (pseudacorus), and the inconspicuous purple or yellow foetidissima, so called from the smell of its bruised leaves, both belong to this section. The former, although at its best near water, will bloom well even in the driest of sandy soil, if helped with occasional soakings of water in summer, and with doses of liquid manure in winter, while the open capsules or seed vessels of the latter, filled with bright red seeds, are valuable as winter decorations. A large proportion of this Apogon family are water-loving plants, and all seem to prefer a soil rich in humus or vegetable refuse and deficient in lime. Those species whose leaves, when held up to the light, are seen to be closely filled with minute blackish dots should be planted in the dampest positions.

The earliest to flower of the Apogon is stylosa or unguicularis, which we have noticed already among the winter-flowering irises. Somewhat later is ruthenica, with grassy leaves and violet-coloured flowers veined with white. Graminea, with its plum-coloured and blue flowers, has a characteristic scent like that of a ripe greengage. From the neighbourhood of the Plains of Jericho comes Grant-Duffi, with flowers of a yellowish colour veined with lilac, while the closely allied Aschersoni has bright yellow flowers veined and dotted with green. The former of these is a capricious flowerer, for plants given to Sir Michael Foster by its discoverer grew at Shelford for 25 years without producing a flower while in the Cambridge Botanical Garden, about four miles away, it has flowered fairly often. Aschersoni is said to flower more freely, but it is a newcomer in England and we have yet to see whether this is true. Another capricious Apogon is ochroleuca, with tall sword-shaped leaves which grow with a characteristic twist. The flower is large, white with a yellow blotch on the fall, and its home is in Asia Minor and Syria. In some seasons it flowers freely, and in others it will not produce a single spike. Possibly it often lacks in England that ripening in later summer which it must get in its native home. It certainly enjoys moisture when making its growth in spring. Aurea and Monnieri are two yellow species nearly related to ochroleuca; both are slow of growth, but well repay patience. Somewhat similar in habit are spuria and Güldenstadtiana, both producing in June and July spikes of flowers with narrow pointed segments, the type of the former being a bright lilac blue, while that of the latter is yellow. White forms of both are known, the signal streak in all cases being yellow.

One of the commonest and most free-flowering of the Apogons is Iris sibirica, with spikes of blue or white flowers standing well above the narrow leaves. The deep blue variety or species called Orientalis sanguinea, from its bright red spathes, and the large white Snow Queen are most distinct. They flower early in June and do best in a moist vegetable soil.

Everything Japanese seems to have a character of its own, and the typical Japanese Iris Kaempferi is no exception to this rule. All the garden forms appear to have been raised from the native laevigata, a flower which in habit somewhat resembles sibirica, except that it has broader leaves. The typical hybrids have flowers as much as eight or nine inches in diameter, with six large petals extended horizontally and producing an effect like that of a large clematis. The colours range from white through grey, pink, red, and purple to blue and violet. Yellow is only present in the signal markings.

In Japan the plants are grown in stiff clay, freely manured in winter and flooded with water during the growing season. Failing clay, they will grow in a rich vegetable soil, but lime appears to be fatal to them. They may be moved early in the autumn about the beginning of September, but after that are best left till spring, when the new roots are pushing out. They bloom from early July on into August.

Of the American members of the Apogon family it is difficult to speak with certainty. Seedlings vary so much that in many cases it is hard to say which are species and which are only varieties. Some, however, are quite distinct. From the swamps in the Southern States comes fulva, of a shade of copper-red quite unusual among flowers. Near neighbours are hexagona and Lamancei, with widely-creeping rhizomes and deep blue flowers with greenish style branches. Earlier than these, which flower in July, are Douglasiana, with spreading flowers of shades from lavender to violet veined with white, and leaves that die off a brick-red colour, and tenax with bright reddish-purple, white-veined flowers, that does well in moist, peaty soil in half shade. Tolmeiana, or missouriensis, and longipetala are closely-allied species, flowering early in June, or even late in May, with flowers in which lavender and purple predominate. All are best moved at the beginning of March.

A small but distinct class of iris is named Evansia, of which the characteristic is the jagged crest which replaces the beard of the Pogoniris. To this family belongs japonica, or fimbriata, with innumerable pale mauve flowers with yellow crests. It will not flower out of doors, and indoors its roots should not be allowed too much room. Fortunately its relations are hardy, among the best being the blue tectorum, which is grown on thatched roofs in Japan, while its white seedling form, which appeared in Europe, is still more charming. Both varieties flower in May and June, and should be given a sheltered position and kept fairly dry in winter. With these flower also the little cristata from America with spreading lavender flowers and characteristic yellow crest, and the still smaller gracilipes with flowers of a redder shade. Both thrive in full sun on the rockery in a vegetable soil, kept moist by a layer of small stones on the surface. The other member of this family in cultivation is Milesii, from the Himalayas. It has broad, bright green leaves two feet or more long, and tall branched flower spikes with rather small red lilac flowers, blotched with a deeper colour, the crest being yellow.

There remain the Xiphions, of which Iris xiphium, the

Spanish Iris, and xiphioides, or anglica, are the best known. The latter owes its name to the fact that some centuries ago it arrived in Holland from the Pyrenees by way of England. The June-flowering Spanish Irises require a dry hot situation with a thorough ripening in summer, while the English Irises, which flower a fortnight later, rejoice in partial shade and a moist rich soil. The colours of the former are white, yellow, brown and blue, while those of the latter range from white through lavender to deep mauve and violet. Other xiphions are juncea, the most richly-coloured of yellow irises, tingitana, a shy-flowering giant from Tangiers, which needs a hot position and to be lifted during July and August and then replanted over a layer of old cow manure, and Boissieri, one of the few bulbous irises that can boast of a beard.

Lastly we must mention the quaint tuberosa, which opens its green and black sweet-scented flowers in March. Some say it is not an iris, but it is very welcome at that windy time, and it grows readily in warm sandy soil.

Irises for Amateurs.

AN INTERVIEW WITH MR. W. R. DYKES.

(" *Garden Life* "—*April 2nd*, 1910.)

For several years Mr. W. R. Dykes, of Charterhouse, Godalming, has devoted a great deal of his leisure time to the study and cultivation of the Iris. In fact, since the death of the late Sir Michael Foster, he has been one of the highest authorities among expert amateurs, not only because he has an extremely interesting collection of his own, but also because he is endeavouring to raise as many of the species as possible from seed, in order to determine the amount of variation within the limits of each species. He also aims at bringing into cultivation some of the numerous species still only known to us as herbarium specimens. When I asked him if he would see me for a chat about his favourite flower, and especially to discuss the question of Irises for Amateurs, he was kind enough to comply with the request, though he warned me that his garden does not lend itself to the picturesque, and is, in fact, rather a workshop than a garden. At the time of my visit, there was, of course, little to see, but Mr. Dykes has about an acre of garden, situated three hundred and fifty feet above sea level, and the irises, grown in clumps for decoration, must be charming in the prolonged flowering season. Owing to the limited space available, Mr. Dykes is obliged to refuse admittance to many plants that he would like to cultivate, and those that are admitted are mostly bulbs, which serve a useful purpose as a change of crop, in a soil so light and poor that it becomes quickly exhausted if plants are left undisturbed for more than two years.

"I do not intentionally," said Mr. Dykes, as we made a brief inspection of his garden, "imitate the nursery garden, but nursery beds, that make no pretence of being artistic, are practically a necessity to a specialist, whose chief occupation is, perhaps, the raising of seedlings."

GARDEN IRISES.

"But now," he continued, as we returned to the house, "you would like to know something about the irises which may be grown by amateurs, looking at the matter from the garden, as opposed to the botanical point of view. From November to August there is no difficulty in keeping up a constant supply of iris flowers, and even in the two intervening months, there are always some plants that seem to mistake autumn for spring, and come into bloom at an otherwise blank season. Last October, I had, I remember, as many as six species in flower at once. Unfortunately, the three species that can be relied upon to flower before Christmas, Vartani, an almond-scented reticulata from Nazareth, alata, from the Western Mediterranean, and palaestina, from the Eastern Mediterranean, want more warmth than we get in early spring to ripen their bulbs for the next season; it is therefore difficult to grow them on from year to year, though freshly-imported bulbs rarely fail, if properly treated.

"With the opening of the new year, the earliest representatives of the reticulata group soon appear. They are so-called because the outer coats of their bulbs consist of a network of fibres. The well-known type from the Caucasus, with its violet and gold flowers, is one of the latest to flower, but it is a beautiful sight on a sunny day early in March. It is preceded by the plum-coloured Krelagei and the various forms under the names of histrio and histrioides, of which there are many local varieties, some of surpassing beauty. The diminutive golden-yellow Danfordiae is especially delightful and makes a brave show in January and February, even though it can only boast of mere bristles, in the place of the usually conspicuous standards. All the members of this group come from Asia Minor or Syria, but it is represented in Southern Europe by a somewhat mysterious relative, tuberosa, with similar quadrangular leaves and seeds of the characteristic reticulata shape. The honey-scented flowers have falls of black velvet, and it is by no means a difficult plant to grow."

HOW TO TREAT BULBOUS IRISES IN POTS.

"But I suppose all these are apt to suffer in bad weather?"

"Yes, the flowers are apt to be spoilt by rough winds, though the bulbs are absolutely hardy. A judicious use of hand-lights or spare frame lights often prolongs that beauty."

"Can they be grown in pots?"

"Yes, all the reticulata group can be grown in pots. They should be treated just like narcissus bulbs, that is to say, potted in August or September, and plunged in ashes or cocoanut fibre for eight or ten weeks. When the roots are formed, by the end of this period, the plants come on rapidly, either in a greenhouse or even in a room, and may be had in flower by Christmas, with very little heat."

"I should like to know of any other classes which will flower early?"

"The Juno group is one that deserves to be far better-known than it is. The growth of these bulbous irises somewhat resembles that of a dwarf maize plant, especially in the stem-producing species. Of these, I have already mentioned alata and palaestina, of which the former grows in vast masses on the hills around Cordova and on the slopes of Etna, to mention only two localities. After Christmas, persica and its varieties Tauri and stenophylla, may be expected to bloom. For some reason, however, these beautiful little irises do not succeed very well with me. It may be, and probably is, that they require a heavier soil than mine."

VARIETIES WHICH VARY IN COLOUR.

"A hybrid of wonderful colour is a cross between sindjarensis and persica (sind-pers). It is of a blue that is almost turquoise. I incline to think that it varies slightly in colour in different soils, and even from year to year in the same position. Other irises undoubtedly vary a little in colour from year to year; for instance, the dwarf yellow forms of olbiensis, and also bosniaca and Talischii (a rarer species which comes from a province on the west side of the Caspian Sea). All these may be pure yellow one year, and in the next veined and clouded with purple. Last year my Talischii were stained with purple, but this year they were yellow. Of the many dwarf seedlings that I have raised, I have labelled the best of the yellows, when they flowered for the first time, only to find that in the next season the colour was spoilt by traces of purple.

" One of the most beautiful of the early Juno Irises which blooms in February and March is Rosenbachiana. The flowers appear almost before the leaves, and are clothed in gorgeous apparel of crimson, gold and white."

" Is it an expensive species to grow ? "

" At present, yes, for it increases very slowly—there are very few offsets. However, it yields a quantity of seed, a pod sometimes containing as many as eighty or ninety grains. Of the taller Juno Irises, sindjarensis itself is a good variety, the flowers being a shade of pale blue, or even white. It has a stem, and produces three to six flowers, rising from the axils of the leaves. Somewhat resembling it in habit is orchioides, a rich orange-yellow, with four to six flowers on a spike, a very good doer. But the best of this group is bucharica, with half a dozen flowers on a stem."

" What is the colour ? "

" It is ivory white with broad lips of deep yellow. Bucharica increases rapidly. Two of my bulbs produced four flower spikes the first year after planting and the next seven. I then shifted the plants and had thirteen flower spikes in the following season. Orchioides alba and coerulea and the recent introductions from Bokhara, *viz.*, warleyensis and Wilmottiana are well worth growing."

PROTECTION FROM WEATHER.

" Do you protect the tall Junos ? "

" I grow them in frames which are always open. This is not because the bulbs are not hardy, but to protect their flowers from the weather. I only use the frames so that the irises may have glass over their heads when they flower, because in this way the blooms last longer, and seeds set more freely. Now we might take some of the non-bulbous varieties."

A MINIATURE STYLOSA.

" Have you any of these which flower regularly in the winter ? "

" Only one species. It is the iris generally known as stylosa ; the name given fifteen years before was unguicularis, but it is a sad burden for so beautiful a plant. Besides the common lilac-coloured type there are several garden forms, including at least one white variety. I have also a very small form from the island of Cephalonia. It is not very free-flowering, but the petals seem to have rather more substance. It is, in fact, a miniature stylosa. The smaller forms are sometimes called cretensis, but can scarcely rank as more than sub-species of stylosa ; they flower in March or April. Stylosa should be planted close up against a wall facing south in a sunny position, in soil that is not too rich. The numbers of the flowers that appear in succession from a well -established clump is really astonishing."

" But before the bulbous irises are over, the dwarf-bearded varieties begin to bloom. The earliest of these is generally the true pumila, which is purple and comparatively rare in cultivation. It has only half an inch of stem, and no plant that is taller than this is a true pumila. The irises which are usually known as pumilas are not the true species, but garden hybrids of species found in Southern Europe, such as pumila, chamaeiris, and olbiensis. Of dwarfs there are several species not often grown, such as bosniaca, balkana, and Straussii, which are in some indefinable way more distinguished, shall we say, than the hybrids."

" What about the tall-growing bearded Iris ? "

" Germanica is the first to flower early in May. Besides the type, there are numbers of local forms, several having rather larger flowers than germanica itself. For instance, Amas or macrantha, but even finer is the hybrid called Oriflamme. G. Kharput is another good variety, which can be distinguished when not in flower by the distinct red edges of the leaves."

THE MOST BEAUTIFUL FLAGS.

" Which do you consider the most beautiful white of the tall, bearded flags ? "

" A hybrid of Kashmiriana, raised by Sir Michael Foster, and named by him after Miss Willmott. Kashmiriana itself is very good, and I am glad to say that I have recently had a number of rhizomes sent to me from Kashmir, some of which flowered in their first season. Albicans, from the neighbourhood of Cadiz, is of a purer white, but perhaps less hardy than the well-known florentina, with its somewhat grey or blue-white flowers. The best pinks are Queen of May and Her Majesty, for pale mauve, pallida, and for choice, p. dalmatica. Then there is a species called variegata, which has yellow standards and falls veined with reddish-brown. Gracchus is a free-flowering form, while Maori King is very richly coloured. Another group of tall, bearded irises, includes Black Prince, which flowers at the end of June and even into July. The falls are of the richest velvety black, and this variety should certainly be grown in all collections.

THE BEARDLESS VARIETIES.

" Of the large class of beardless or Apogon Irises, one, stylosa, has already been mentioned. Its last flowers usually open in April, and then there is a gap of a month or more before other members of this section come into flower. One of the earliest is missouriensis with delicate flowers of lavender and white, and it is usually soon followed by longipetala, another American from the Pacific Coast. Its Californian neighbours are, to my mind, among the most beautiful of all irises, but also, unfortunately, among the most difficult to establish, though once established they flower well. Douglasiana of many varying shades, is one of the easiest of the group, while bracteata, rich yellow, with crimson veins, is one of the least amenable. Tenax flowers freely with blooms that vary from a pearly grey, through mauve to a rich claret colour."

THE SPURIA GROUP.

"What other groups do you recommend?"

"There are some fine ornamental plants in the spuria group which may be recommended to those who rejoice in a heavy rich soil. The true spuria is a small plant, found in marshy places in the south of France, but its relatives extend all through Asia to Kashmir, which has a form of spuria, and also the golden aurea. Notha is a robust form of spuria with deep blue flowers. It is closely allied to ochroleuca, a tall, decorative plant, with white and yellow flowers. To this group also belongs Monnieri, with large, deep golden flowers, which is probably only a sport, and not a wild species. Amongst the series of hybrids raised by Sir Michael Foster is Monspur, a cross between Monnieri and spuria, with flowers of different shades of blue.

"The sibirica group, of which there is an eastern and a western form, each having a white variety, is noteworthy. The western form is that usually sold as sibirica, while orientalis, which has red spathe valves, comes from the Far East. A good form of this is known as Blue King, while a corresponding white form is called Snow Queen. All this group flower chiefly in June. Closely allied to sibirica is Clarkei, a plant from the Sikkim Himalayas, and nearly related to Clarkei is the Yunnan Iris, Delavayi. Mention might also be made of a number of beardless irises which do not come under any of these groups. There is, for instance, graminea, which hides its flowers in the grassy leaves, and has a scent which resembles that of a ripe greengage."

"When does the Kaempferi group come in?"

"In July. As garden plants they are largely the creations of the Japanese, and delight in rich soil and abundant moisture during the growing season. In such conditions they flower well, as, for instance, at the edge of ponds, and in the famous ditch in the R.H.S. gardens at Wisley."

" Perhaps you would now tell me about some that are more difficult to cultivate ? "

LOVELY ONCOCYCLUS FLOWERS.

" These certainly include the Oncocyclus, a group which, however, contains some of the most lovely flowers that we possess. For the last three years I have grown plants of this group by taking them up in July, drying them off in the shade for a few days, packing them up in dry material and storing them in a temperature of about thirty degrees F. I plant them in rich soil at the beginning of March and they then flower well in June. The grandest of this group, which Foster described ' as of surpassing grace and beauty,' is Gatesii, of a delicate silver-grey. A very lovely neighbour of Gatesii is Lortetii, veined and dotted with rose colour on a creamy ground, while the most commonly seen and cheapest to buy is susiana."

" You have not said anything about the Regelia group ? "

A HINT ON REGELIA CULTIVATION.

" The Regelias are easier to grow than the Oncocyclus, and do not require cold storage, but the rhizomes should be lifted from July to October, unless they can be covered with glass in their beds. Of this group, only three or four are well-known, such as Korolkowi (white, with brown veinings), Leichtlini (bronzy-violet and yellow), vaga (very similar to, if not identical with, Leichtlini) and Suwarowi—all of these are worth growing. Iris lovers who cannot succeed with Oncocyclus may find some compensation in growing Regeliocyclus hybrids, which need the same treatment as the Regelia group. They combine the size of the Oncocyclus flowers with the greater robustness of the Regelia seed parents."

XIPHIUMS AND XIPHIOIDES.

" Then there is the Spanish Iris ? "

" Yes, and it is the very antithesis of the Oncocyclus species as regards ease of cultivation. Any light, rich warm soil suits it."

Some Early-flowering Bulbs.

BULBOUS IRISES.

(" *The Garden* "—*January* 5*th*, 1924.)

Some of the most beautiful and earliest to flower of all bulbous plants are the irises of the reticulata section. The almond-scented grey-blue I. Vartani from Palestine may be in flower at Christmas, and there is a white form of it spotted with blue which is extremely beautiful. It is closely followed by I. histrioides, from the mountains of northern Asia Minor, with its large flowers of a brilliant blue which appear before the leaves have had time to develop. This late growth of the foliage is an advantage to the plants, because it has a better chance of attaining its full development later than has, for instance, I. Vartani, of which the leaves are often so severely damaged by bad weather that no sound bulbs are formed for the succeeding year.

The same fate often overtakes I. histrio, which in some of its forms differs chiefly from I. histrioides in the earlier development of its foliage, and the yellow I. Danfordiae, from the mountains of Cilicia, which is distinguished by the fact that its standards are reduced to mere bristles, so small as almost to escape notice altogether. Even more brilliant than any of these is the rare I. Bakeriana, with its falls tipped with blue-black velvet and its slender eight-ribbed leaves. All these irises need a sheltered sunny corner in rather rich light soil made porous by the addition of a liberal supply of lime rubble. Several of them form, at the base of the flowering bulb, a number of minute bulblets, which, if left untended, rarely develop into full-grown bulbs and which need careful nursing for a year or two, either in pots or planted out in a cold frame. I. reticulata itself and its wild red-purple counterpart from the Caucasus, commonly known as Krelagei, come later in February and March and are better able to take care of themselves.

There is also a variety of garden origin with pale blue flowers which has been named Cantab, and which, like the deep blue typical form, seems to have something in its constitution which enables it to persist and increase in gardens and under conditions where the wild forms die out after a few years. There is a central line or ridge of deep yellow on the falls.

Of early-flowering Juno Irises the most wonderful is easily I. Rosenbachiana from Turkestan, with its brilliant flowers of all shades of colour from white to deep blue and red-purple, set off with a conspicuous golden crest. This and the many varieties of species akin to I. persica need sheltered positions and protection after flowering to enable them to mature their foliage, but the white and yellow I. bucharica, the golden I. orchioides and the purple I. warleyensis, which do not flower until April, should hold their own in well-drained soil in any sunny spot that is not too wind-swept.

Early-flowering Bulbous Irises.

(*" The Garden "—June 21st,* 1919.)

Bulbous irises are among the most precious of the plants that can be relied upon to flower in our gardens in some of the darkest months in the year. Their flowering time alone would make them valuable even if they were not in themselves some of the most richly coloured of all hardy bulbous plants. Any garden which has a few warm sunny corners, providing a certain amount of shelter from the storms of winter, need hardly ever be without some irises in flower from Christmas onwards, and there are other species which will be more easily obtainable and which will usually give us flowers in the darkest days of November and December.

These early-flowering species of iris belong to one or other of the two groups of reticulata and Juno Irises. The former gets its name from a Latin word meaning a net, and has its bulbs covered with a network of fibres, while the name of Juno Irises seems to have been applied to the latter for some purely arbitrary reason.

Of the reticulata irises, the two best-known forms are the deep violet blue reticulata and the red purple Krelagei. The former is the better known, but there is a mystery surrounding its origin and introduction, for there seems to be no definite record of its ever having been introduced direct to our gardens from the home of its species in the Caucasus. All the wild plants that come direct from that neighbourhood are always red-purple forms, to which the name of Krelagei has been given, and what is still more curious is that seedlings obtained from the blue type always have red-purple flowers, although blue forms occur when a second generation is raised from these red-purple seedlings.

However this may be, both Krelagei and reticulata are most valuable irises. The former is in flower from January onwards, and the latter in February and March. Their one fault is that the bulbs are liable to fall victims to a deadly fungoid disease, which first marks the bulbs with inky black blotches, and then destroys them wholesale. The remedy against a bad attack has yet to be discovered, but a frequent transplantation during the resting season and the avoidance of anything in the nature of half-decayed leaves or raw manure will go a long way towards keeping the bulbs in good health.

In Palestine there grows an allied species, Vartani, whose flowers may be either a dull slaty blue or white mottled with blue. This comes into flower in December and has a delightful scent of almonds, but, unfortunately, it can seldom be relied upon to form sound flowering bulbs for the next season.

Near Amasia in northern Asia Minor there grows the real I. histrioides, with large flowers veined and mottled with two shades of blue-purple on a white ground. Its flowers develop almost before the leaves have pierced the soil and it is a pity that it is one of those species of which a flowering bulb, instead of giving rise, as with reticulata and Krelagei, to one or two bulbs of flowering size and a few smaller bulblets, seems frequently only to leave behind it a host of bulblets no bigger than a grain of wheat, which take several years to grow into flowering size. I. histrio from Southern Asia Minor, has the same bad habit, and flowers of a very similar colour scheme. Its leaves are further developed at flowering time than are those of I. histrioides, and though they set off the flower to advantage, they often fall victims to late frosts, and are consequently unable to build up flowering bulbs for the following season.

There is one remarkable species with bright yellow flowers in which the standards are reduced to a fine, almost invisible point, namely, I. Danfordiae ; it is found on the mountains of Cilicia, and, in this sandy soil at any rate, behaves like histrioides, so that a flowering bulb leaves us only a legacy of minute bulblets.

All the foregoing species have long, narrow leaves with four unequal sides, and a whitish horny tip. In northern Mesopotamia there grows a relative in which the leaves are tubular with eight horny ridges, the richly-coloured I. Bakeriana, the tips of whose falls are made, as it were, of deep blue-black velvet. It is a delicate little species, which can be crossed with reticulata to give a delightful series of brilliantly-coloured forms of all shades of blue-purple and red-purple.

The Juno Irises are distinguished by their broad channelled foliage, by the horizontal or even dropping " standards," and by the fact that the bulb in its resting state has attached to its base a number of fleshy store-roots. These latter are brittle and are very easily detached from the base of the bulb. When this happens the bulbs are much weakened and seldom, if ever, really recover their vigour. Within the section there are several well-marked groups, though our knowledge of many of the species is so scanty that they cannot satisfactorily be assigned to any of the known groups.

The Mediterranean species, alata in Spain, North Africa, and Sicily, palaestina in Persia, and persica, with its numerous sub-species in Asia Minor and Armenia, have all wide wings to their falls which arch over and enclose the style branches. I. sindjarensis is from the hills in northern Mesopotamia. This has flowers of various shades of pale blue or white, while good forms of persica seem to combine pale blue, sea green and rich purple with a golden central streak on the falls. I. Tauri, with flowers of red-purple with golden stripes, and I. stenophylla with flowers of two shades of blue-purple, are both closely allied to persica, and seem to be easier to grow. Persica itself must have a heavy soil, from which it is extremely difficult to extract a bulb with its roots uninjured, and consequently it is seldom seen growing luxuriantly although it has been known in cultivation for at least 100 years. I. alata has very large flowers of some shade of blue-purple, while I. palestina is very variable and has colour forms that may either be blue, green or pale-yellow.

All these Juno species with the wide-winged falls have spherical seeds and are thus easily separated from the group of vigorous species from Turkestan, of which bucharica is probably the finest and best known. This has large flowers of white and deep yellow, falls without the conspicuous wings of I. alata, and cubical seeds of somewhat irregular outline. Its allies are the deep yellow orchioides and the rich purple warleyensis with both of which it will hybridise readily. From these crosses I have obtained a number of seedling forms, of which the sturdiest is like bucharica, but has flowers that are wholly yellow, while some of the most beautiful are those in which the purple elements of warleyensis are reduced to a delicate shading of pale blue.

Of all these irises the growth and foliage is very characteristic. The habit is not unlike that of the maize or Indian corn, and as many as four or even seven flowers spring from the axils of the uppermost leaves, so that the display lasts a considerable time. Here, at any rate, in light sandy soil the bucharica group does extremely well, and seems as easy to satisfy as the Asia Minor plants are difficult. Large beds of seedling plants make a brave show throughout April, and these irises are certainly worth a more extensive trial than has hitherto been accorded to them.

Of the lesser-known species of the Juno group, some of the most striking are Willmottiana, with broad, deep green, glistening foliage and striking flowers of lavender-purple and white, Tubergeniana with deep yellow flowers and a straggling beard, and Rosenbachiana, which is certainly one of the most gorgeous of all hardy bulbous plants. Here in cold frames it is in flower for nearly three months in the earliest part of the year. It is almost stemless at flowering time, but it agrees with all the other species in sending up three or four flowers from the axils of its leaf. I. Rosenbachiana stands, however, well apart from all the other known species, both in the peculiar formation of its seeds and in the curious strap-like shape of its falls. It is a Turkestan plant and seems to thrive in warm, well-drained sand, well enriched with humus.

All the irises mentioned are hardy and will survive the hardest frosts in the open ground, though, naturally, the flowers will suffer. They are, however, well worth the protection of a cold frame to keep their flowers unspotted and to enable them to ripen their foliage and form satisfactory new bulbs. In the open their foliage is apt to be so much weakened by the buffetings of the storms of winter that the bulbs themselves are weakened and tend to dwindle away.

The soil should be well-drained and rich in well-decayed humus, and, when once a bed has been well made-up, the plants may be left undisturbed for three years and should increase annually in vigour. Eventually they will become too crowded, and then it is necessary to undertake the delicate operation of lifting the bulbs without breaking off the brittle store-roots. This is to my mind one of the most exasperating tasks that a bulb-grower can be called upon to undertake. I find it best to give the ground a good soaking of water a few hours before attempting to lift the bulbs, for there is then less danger of breaking all the roots than when the ground is so hard and dry that it only splits into huge lumps. Nothing is gained by keeping the bulbs long out of the ground, and they should be replanted in September or, at the latest, in early October.

Some Early-flowering Irises.

(" *The Gardeners' Chronicle*"—*January* 11*th*, 1913.)

The experience of the summer of 1912 has shown that we have still much to learn as to the conditions which favour or prevent the production of flowers by those species of iris which bloom in winter. In August, when week after week brought little or no sunshine, but rather rain and low temperatures, it seemed as though such species as I. unguicularis and the smaller bulbous irises would be unable to ripen their growth, and the prospect of them producing their usual crop of flowers became more and more gloomy. If the time could have been found, I should certainly have lifted all my bulbs of the Reticulata group, and, by storing them in dry sand, have attempted to give them artificially that ripening which they seemed unable to obtain naturally. However, the time for this slipped by, and the bulbs remained in the ground to take their chance.

The first surprise came early in December, when I found that two or three clumps of a very narrow-leaved form of I. unguicularis were full of buds. Unfortunately, I have been unable to ascertain from what locality this form comes. I obtained it some years ago from a nurseryman, who aroused my curiosity by advertising an Iris agrostifolia, of which no botanical description appears to have been published. The name is suitable, even though it is a Graeco-Roman mongrel, and, presumably, means grassy-leaved. As a matter of fact, the tough, wiry leaves are not more than one-twelfth of an inch wide and about 12 to 18 inches long. To judge from herbarium specimens, this is probably a Greek form, similar to that which was described by Janka as I. cretensis. As in many other cases, the author of this name was so intent on showing that the plant was not a certain iris (in this case I. humilis, with which no one with any knowledge of irises could easily confuse it) that he altogether omitted to say how he distinguished the plant he was describing from others that are obviously related to it. A close examination of this and other forms which I have received direct from Greece has failed to discover any difference except size between them and the Algerian I. unguicularis. Until this season these narrow-leaved forms have never bloomed until March or April, and this seemed a point of difference, which, however, now appears to have vanished. The flowers are smaller and have not the delightful scent of some Algerian plants, but the display

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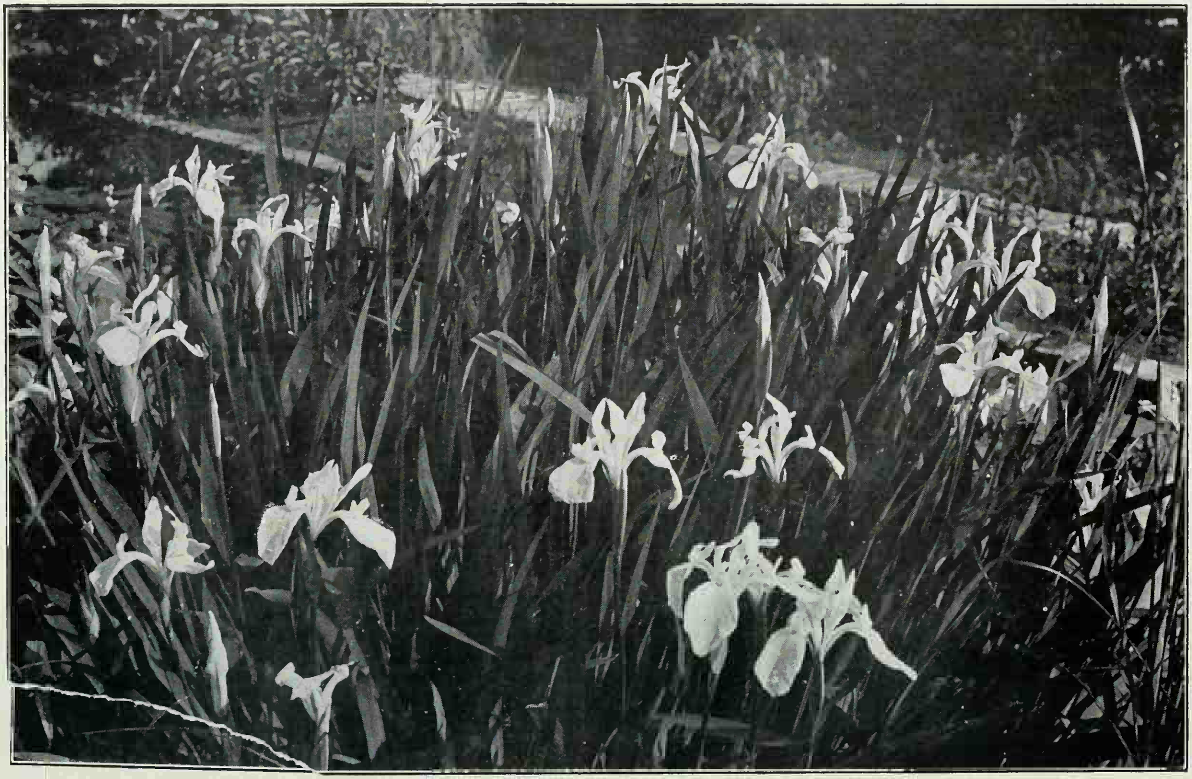
Mr. W. R. DYKES IN HIS FIRST IRIS TRIAL GARDEN, 1907.



IRIS ALBO-PURPUREA

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lasted all through December and still continues at the commencement of January.

Moreover, some curious plants, which I received some years ago from Muller, of Nocera Inferiore, under the varietal name of pontica, after hitherto remaining flowerless, are now throwing up their buds. The foliage is scanty, short and broader than that of the ordinary Algerian form of I. unguicularis. The few flowers that have already opened have been enough to show that it will be extremely difficult, if not impossible, to distinguish this plant from another which has lately been introduced as I. lazica. The name pontica suggests the Black Sea, and Lazistan is on its south-eastern shore, so that the identity of the plants is not improbable. The flowers are scentless, smaller, of a darker purple, and more distinctly veined than those of typical I. unguicularis. What is remarkable is that, like the Greek forms, the plants from Pontus and Lazistan have always hitherto refused to flower until March or April.

But if it was a surprise to find buds on these various forms of I. unguicularis in December, it was no less astonishing to find that beds of I. histrio and I. histrioides were also showing their buds before the 20th of that month. Since then it has been possible to gather them daily, and they show off their beauty to the best advantage if stuck into wet earth or sand in small flat bowls. In water they are difficult to arrange, but, by filling the bowls in the manner suggested, they are easily induced to hold themselves erect.

A certain amount of confusion appears to exist between I. histrio and I. histrioides, and indeed at first sight there is considerable similarity between the two. Both vary to a large extent in the exact shade of colour and in the markings, and, moreover, each appears to possess more than one form. I am inclined to think that they must be separated from I. reticulata by their method of increase. Both produce at the base of the parent bulb a large number of minute bulblets not much bigger in many cases than grains of wheat. These never occur in the case of I. reticulata, so far as my experience goes. The chief points of difference between I. histrio and I. histrioides seem to be these. In I. histrio the leaves are at least as tall as—if they do not overtop—the buds; in I. histrioides the buds often pierce the soil before the leaves appear at all. The flower of the former is turbinate, that is to say that the hafts of the falls rise at a sharp angle and form with the standards the outline of a funnel or inverted cone; in I. histrioides the haft of the fall extends almost horizontally.

In colour the latter is more uniform, and the deep blue of the edge of the blade of the falls extends for some distance towards the centre, where it gives place to a white ground blotched with blue. In typical I. histrio the colouring is produced by mottlings and veinings of deep blue distributed irregularly all over a paler blue ground, moreover, the standards are very narrow, and curve gracefully outwards at the tip ; in I. histrioides they are broader, and are held more erect. There is, however, a form of I. histrio in which the standards are erect and even actually curved, almost meeting at their apex. To this I have ventured to give the varietal name of orthopetala. The spathes are rather longer than those of the typical form, and the leaves tend to develop more fully before the flowers appear. It would be a help to know where this form is to be found. Herbarium specimens of these species and of their forms are very unsatisfactory, but I am inclined to think that this variety orthopetala comes from Lebanon. In any case, typical I. histrio is found in the neighbourhood of Marash, while I. histrioides comes from further north in Asia Minor and is obtained in the neighbourhood of Amasia. It is to this species rather than to I. reticulata, which is probably confined to the Caucasus and Northern Persia, that the plant described by Foster as I. sophenensis should probably be referred. It derived its name from the ancient name of the district in which Kharput is situated. It is found near this town and agrees with I. histrioides in its method of increase, in the poise of the falls, in the short, stout foliage at flowering time, and in its coloration.

Another surprise of this curious season has been the flowering in the last week of December of a number of plants of I. Rosenbachiana, which does not usually flower until February or March. This species is, unfortunately, as rare as it is beautiful. It comes from the mountains of Turkestan and is a true Alpine plant. That is to say, that it flowers as soon as the foliage pierces the soil, and the pace at which the flowers develop when once the broad, nipple-shaped sheath of the leaves has appeared above the surface is simply amazing. In a few days the gorgeous flowers are fully developed and stand 4 or 6 inches high on their long perianth tubes. In colour the plants are very variable, one of the commonest forms having flowers of white and crimson, with a raised golden crest on the falls. The leaves only develop later in most forms but it is then clear that the plant is a true Juno Iris, producing its flowers from the axils of the leaves. Unfortunately, my experience, and I believe, that of others, has been that I. Rosenbachiana increases very slowly by offsets. My present plants have all been raised from seed. This is a slow process, taking about four years, but when at last the flowers appear the trouble is well rewarded. Like many other plants in which increase by division is slow, seeds set with some freedom if the flowers are protected from wet, which, of course, destroys the pollen. The capsules, also, contain as many as 80 or 90 seeds, though these do not, unfortunately, germinate very easily. They often lie dormant for several years and then suddenly germinate.

Many attempts to hybridise I. Rosenbachiana have been made and have failed, and I believe they are doomed to fail until some other members of the group to which this Iris belongs are introduced into cultivation. All the Juno Irises that we have at present, except I. Rosenbachiana, belong to one or other of two groups, which have never so far been crossed, and it is therefore not surprising that this exception, which is totally distinct from both groups in its seeds and the shape of its falls, should refuse to hybridise with the members of either. Possibly I. Rosenbachiana stands entirely alone, but I am inclined to think that I. drepanophylla, from the neighbourhood of Askabad and southward into Afghanistan, and possibly also I. linifolia, from Bokhara and Ferghana, may prove to be allied to it.

Early Bearded Irises.

(" *The Garden* "—*June,* 1918.)

When examined under a microscope, most irises appear to be bearded, for in nearly every case the centre of the back part of the blade of the falls is covered with minute projecting processes which might almost be called hairs. Two bulbous species, Tubergeniana and Boissieri, have a few straggling hairs which are obvious to the naked eye, but the name of Pogoniris, from the Greek word for a beard, is usually bestowed only on the well-known class of irises to which the so-called Iris germanica belongs, and of which a few representatives are to be found in nearly every garden.

Probably no iris name is more frequently found in catalogues and on garden labels than that of pumila, and yet the true plant is comparatively rare in cultivation. It is a native of the limestone districts of Central and South-eastern Europe, though, strangely enough, it occurs also in parts of Hungary, on the northern shores of the Black Sea, and near Sarepta on the Volga, where the soil is presumably sandy. From the last two sources I have never yet succeeded in obtaining living plants but the Hungarian forms grow and flower in the sandy soil here in a way that plants from limestone homes never succeed in imitating. I remember spending ten hours on a blazing hot day at the end of April searching for I. pumila in the stony wastes near the Austrian naval harbour of Sebenico on the Dalmatian coast. All day long I climbed up and down among the rough limestone, and was just about to give up the search when at last I found a few patches of tiny leaves not more than 1 inch or 2 inches in length, and the withered remains of a single flower projecting from among the stones. The rhizomes were embedded in the stiff red soil which always seems to form in the course of time in the crevices among the limestone. The dried remains of the flower were enough to show that I had found I. pumila, and though I did succeed in getting a flower or two from the rhizomes in my garden here the next year, it was not until I saw the plants which had developed from some of the rhizomes in the heavy fertile loam of Northamptonshire that I realised the possibilities of I. pumila. There each rhizome had grown into a circular clump, from which there rose twenty or thirty flowers, so closely packed as almost to hide the foliage. Here in this sand I can never get I. pumila to do so well, but, by dint of frequently moving the plants into as rich a top soil as I can produce, I usually contrive to have a fair number of flowers in early April. The plants do not root deeply and therefore soon exhaust the soil within reach of their roots. Then the rhizomes rapidly begin to dwindle.

I. pumila is valuable for more reasons than one. In the first place, it flowers before all other Pogoniris. This year the few warm days towards the end of March actually brought out the first flowers on March 25th, but it is usually not in flower until early in April. Another advantage is the extraordinary range of colours to be found in the flowers. It is true that my plants from Hungary are all of one or two forms, a red-purple and a blue-purple, but my Dalmatian plants were all different, various shades of purple, yellow, and even white. I have long since given up trying to describe the colours of irises as being lilac, mauve, lavender or violet, because I have found that no two people agree as to what these colours really are. It seems best to confine oneself to red-purple and blue-purple, and to qualify these two by the addition of pale or dark. I have also received plants from Moravia, of which every one was different, and the same is the case on the Geissberg, near Vienna. At the present moment some dozens of seedlings are opening here, and the variety among them is endless, though yellow forms are certainly less numerous than the purple.

I. pumila is distinguished from I. chamaeiris, with which it is so commonly confused, by the fact that it has practically no stem and a comparatively long perianth tube between the ovary and the segments of the flower. I. chamaeiris, however, always has a stem that is at least as long as, if not longer than, the tube. In I. pumila when the seed capsules are ripe, they are quite sessile among the leaves but those of chamaeiris are always raised on a stem. Moreover, the shape is quite different. The seed-pod of pumila tapers gradually to a sharp point and has a further peculiarity in that the internal divisions, which should divide it into three entirely separate compartments, usually gape apart towards the base ; that of chamaeiris narrows no more abruptly at the apex than at the base and is divided into three compartments in orthodox fashion.

I. chamaeiris is only found in Southern France and Northern Italy, but, because local conditions influence its growth and stature, it has been given a number of specific names. The actual size of an iris is of little importance ; it is the relative size of the tube and stem that matters. Thus I remember finding on Mount Majour two yellow irises. That which grew among bushes near the base was quite a foot or more in height and fitted the description of lutescens, but, unfortunately for the author of that name, it was really the same species—namely chamaeiris—as the small plant 2 inches or 3 inches in height that was growing on the open rock higher up the hill, for the two plants flowered side by side in my garden here the next year and were identical in every way. I. chamaeiris is just as variable in its many colour forms as I. pumila, for it can be obtained in endless shades of purple and yellow, and there are also white forms. Moreover, as with I. pumila, in some localities one colour seems to prevail, but in others many forms grow together. Thus on Mont Coudon, which towers above Toulon, all the plants seem to have yellow flowers, but at Roquehaute, near Beziers, many forms grow together. Those gardeners who delight in named varieties will find them in catalogues, but others will derive more pleasure from raising their own seedlings and picking out those forms which please them most. There is endless variety in height, colour and fragrance.

In south-eastern Europe there is another pair of species, corresponding to I. pumila and I. chamaeiris, namely, I. mellita and I. Reichenbachii, which differ from the western pair in having prominent, sharp keels to the spathes which enclose the buds. In I. pumila and I. chamaeiris these are rounded and shapeless ; in I. mellita and I. Reichenbachii they are flattened and have a much more definite shape by reason of the rigid keel that runs along their outer edge.

I. mellita is stemless and has a long tube ; I. Reichenbachii has a stem of 6 inches or 8 inches or less and a relatively short tube. Both have purple and yellow flowered forms, but the texture of the flowers is quite different from that of I. pumila and I. chamaeiris. I. mellita is chiefly found near Philippopolis in Bulgaria and one form of it has red-edged leaves and is sometimes grown under the name of rubro-marginata. I. Reichenbachii has many synonyms, for the purple form has been christened balkana, Athoa, macedonica and Straussii ; while serbica, bosniaca and Skorpili are merely names of the yellow form. Both mellita and Reichenbachii are very desirable irises, but to do well they must have a good strong loam and plenty of lime.

Far away in Tibet there is another pair of dwarf bearded irises—tigridia and Potanini. The former has a short tube and finely pointed leaves and the latter a longer tube and curiously blunt or abruptly rounded leaves. Mr. Farrer encountered both species on his recent travels, but it remains to be seen whether he has succeeded in introducing them to our gardens. Of both there are yellow and purple forms, and it would be interesting to see both in our rock gardens.

Differing widely from the irises already described, and belonging perhaps rather to the Regelia section than to the Pogoniris proper, are the beautiful little I. flavissima or arenaria from Hungary and Siberia, I. Bloudowii from Siberia and I. mandschurica from the Far East. The first-named is the most common in our gardens, and sometimes flowers freely from its slender, running rhizomes. The flowers are of a brilliant yellow with golden beards.

In southern Italy and in Sicily—on the slopes of Mount Etna, for example—grow I. pseudopumila, which comes midway between I. pumila and I. chamaeiris, for it has the long tube of the former and the stem of the latter. It needs a warm, sunny corner if it is to succeed in our climate and its many colour forms would make it welcome if only it did not so frequently succumb to our winters.

Perhaps the rarest of the dwarf European irises is I. sub-biflora, which is only found on the rocks near the seashore in

Portugal and probably also in a few localities in Southern Spain. It was first described by Clusius, when he found it growing near Coimbra in 1565, and I have one form of it that has grown here unprotected for eight or ten years, and which, though it does not always succeed in escaping late frosts, which destroy the buds, sometimes produces a number of magnificent flowers of a very deep blue-black colour, finer than that of any other known irises. Other forms are of a poor reddish-purple colour. Botanically, I. sub-biflora comes very near to I. pseudo-pumila, but the spathes are shorter, greener, more acute and more rigid. Both plants flower in April in England. Clusius tells us that his plant sometimes flowers again in the autumn, but it loses this desirable habit in our climate.

August Irises.

(" *The Garden* "—*September 28th*, 1918.)

An iris garden in August is never gay with flowers; it consists almost entirely of foliage and ripening seed-pods. There are, however, one or two irises which always give me flowers in this month. At any rate they have done so now for several years, and I have no reason to suspect that they will ever fail me here, although it would be rash to expect that they would certainly behave in the same way in other gardens where the conditions were perhaps less genial.

In any large collection of irises it frequently happens that here and there an odd flower spike appears in August or September. This year I have already seen flowers of the Balkan I. Reichenbachii and of the wild form of I. variegata, and I remember once having a number of spikes of flowers of Gracchus, a garden variegata, late in September. I. aphylla comes from the neighbourhood of Ermihalyfalva in Hungary. Plants of this form of aphylla flower regularly twice every year—in May and again at the present time. They are remarkable for the vivid dark-purple coloration of the base of the leaves and also of the whole of the inflorescence when this first appears among the leaves. It is extraordinary to see these dark purple buds emerging from the green of the leaves, and, since in spring the buds come up almost with the leaves, the appearance of the plants in April is even more remarkable.

When the plants flower the spathes are wholly of a red-purple colour which is also suffused over the upper part of its stem and of its branches. The flower is of a deep blue-purple with a bluish beard. The stem is much branched, and the main lateral branch starts very nearly at the ground line. This forking of the stem below its centre is characteristic of I. aphylla, of which there are numerous forms in Central Europe and even in the Caucasus. It is an extremely hardy plant and owes its name "leafless" to the fact that it loses its leaves entirely in the autumn and remains dormant underground until the spring.

The other iris that always flowers here from August until October resulted from a cross between two most uncongenial parents. It happened a good many years ago that I noticed in June a single flower-spike on a patch of purple chamaeiris. I. trojana was, I believe, the only bearded iris that then remained in flower. At any rate, I used its pollen to fertilise the flowers of chamaeiris. A few seeds formed, and one germinated. The plant developed into an iris intermediate in its growth between that of chamaeiris with its simple unbranched stem 6 inches to 12 inches high, and that of trojana with its much-branched stem 3 feet or more in height. The hybrid grows about 20 inches or 24 inches high with two lateral branches arranged as in typical I. germanica, four or five flowers of dark blue-purple, and a beard of bluish hairs tipped with dull yellow. The flowers are neither very striking nor very large but the plants are valuable because they invariably give me two crops of spikes, in spring and in autumn.

It is curious that the flowers of these two autumn-flowering irises should be so very similar in size, shape and colour. As they stand before me they form a striking and very pleasing contrast to the yellow and salmon tones of the beautiful hybrids of Gladiolus primulinus.

Autumn-flowering Irises.

(*"The Gardeners' Chronicle"—November 5th*, 1910.)

Although a garden that is devoted mainly to irises can never be as gay in the autumn months as it may reasonably be expected to appear in May and June, there are, nevertheless, a fair number of irises that can almost certainly be depended upon to bloom in the months between August and Christmas. It is, therefore, not impossible to have some irises in bloom during every week in the whole year. To obtain this end, it may be necessary to buy each year newly-imported bulbs of I. alata and I. Vartani but it is worth some sacrifice to have flowers in the open in the dark days of November and December.

The time at which these two species flower depends to some extent on the weather, but still more on the date at which the bulbs are put in the ground. Sound, well-ripened bulbs, planted early in August, should be in flower by the first week in October, and as I. alata generally produces several flowers in succession the display lasts some time if the weather is not too boisterous or severe.

Iris alata is a native of the western shores of the Mediterranean, being found in Spain, Morocco, Algeria, Sicily and Italy, and it appears to be largely cultivated in the last-named country for export purposes. As in the case of the other members of the Juno group, its fleshy roots are easily broken off from the base of the bulbs and those bulbs to which few or no roots remain attached can hardly be expected to produce fine or numerous flowers. It seems to do best in a rich, well-drained, if somewhat heavy soil, in a warm corner which catches the winter sun. Its eastern relative, palaestina, from Mount Carmel and other parts of Palestine is very similar, but smaller, and the flowers are usually of a green or yellow colour, though forms have been found that resembled the deep blue of alata. For some reason it seems disinclined to flower much before Christmas, but early planting might overcome this difficulty.

The third bulbous iris that may be depended upon to flower before Christmas is I. Vartani, which is interesting as coming from the neighbourhood of Nazareth, and as being, therefore, the southernmost representative of the reticulata group. Its colour is apt to be a rather poor slaty blue, but it atones for this by giving out that most delicious scent of almonds when the sun shines for a moment upon it.

The difficulty of keeping these three bulbous irises from year to year lies in the fact that they expect to be able to develop their foliage immediately after flowering and then go slowly to rest and aestivate. Unfortunately with us their young leaves suffer sadly in the worst months of the year, and it can scarcely be a matter of astonishment that the bulbs are seldom sufficiently ripened to do well in the following year.

So much for the autumn-flowering bulbous species, and, if we had no others, September and October would be usually blank. Fortunately, however, several non-bulbous species seem to bloom at this time with very fair regularity, and I am inclined to think that this is the case not only in the warm, dry Surrey sand, but also in heavier and damper soils.

I. rubro-marginata, a variety of I. pumila, from the neighbourhood of Scutari, flowers here regularly in September and October in sunny nooks on the rockery, and, if anything, is more floriferous then than at its other flowering season in April. The peculiarity of this plant is that the crimson edge to the leaves and spathes is but slightly marked, if visible at all, except at the flowering season. This character is found again in the form of I. germanica from Kharput in Asia Minor, and in another, which was sent to me a year or two ago from Kashmir. In these, too, it is not persistent throughout the year and scarcely constitutes a sufficient difference to justify a specific name.

Another curiously local iris, namely, I. lacustris, which appears to be a form of cristata and only to be found on the shores of Lakes Huron and Michigan, also flowers regularly at this time, and with me, at any rate, more freely than in the spring. Its claim to specific rank is somewhat doubtful for it differs in no way from cristata, except in its diminutive size, and, moreover, it possesses in common with that iris a peculiarly characteristic seed, which does not occur in any other known species. Last year I obtained a few seeds of lacustris and a plant that I have already raised from these bids fair to grow to larger dimensions than its parents.

There is one unique plant here, which, within the diameter of a little more than a foot, has now for the third year in succession produced at this season a sheaf of spikes about two feet in height. This year there are at least 15, and each stem bears four or five flowers. It is the solitary product of a cross between a stray flower of a form of I. chamaeiris which happened to appear late in June and I. trojana. The flowers of the hybrid are intermediate between those of the two parents, being of a rather dull blue-purple, with a blue beard. In stature, too, the hybrid is a compromise, and though compromises are never entirely satisfactory, this plant is, nevertheless, a very welcome addition to the iris garden at this time.

Another regular flowerer is a form of the ubiquitous I. Güldenstadtiana. The flowers are small, of the usual dingy yellow or pale purple, and the plant can hardly claim to be even of botanical interest, the euphemistic term beloved by the compilers of nurserymen's lists.

A prettier plant is a pearly-grey flowered hybrid of I. Alberti which was raised by Sir Michael Foster, of which he did not know the pollen parent. This plant is apt to flower at any time, and the blooms show clearly the influence of I. Alberti in the curious way in which the heavy veining at the base of the falls ends abruptly at the level of the end of the beard. This is always a marked characteristic of I. Alberti and persists in seedlings, even in two yellow forms of that species that appeared for the first time this year.

This ends the list of the irises which can be relied upon to produce flowers in autumn though many others are sometimes so good as to favour us at this time. Last year, I remember that the variegata Gracchus flowered most freely in October, and this year there are in flower now, I. Milesii and a hybrid of germanica crossed with benacensis, raised by a neighbour and affording one of the very few instances of hybrids of germanica raised in this country.

Irises from October to August.

(" *The Garden* "—*March 23rd*, 1907.)

It may be interesting to you to know that with the aid of a few hand-lights and a frame which has no front and open sides, and which, therefore, only keeps rain and a certain amount of frost off the plants growing in it, I have had a continuous display of iris bloom from the last week in October until now, and I do not anticipate any break until August.

Alata was the first to flower in October, and one plant is just opening its first bud to-day. This was closely followed by Vartani. Since the new year I have had stylosa, histrio, Danfordiae, histrioides, Krelagei, Rosenbachiana, Bakeriana, palaestina and various forms of persica all in flower one after the other and reticulata is now beginning to bloom.

I. palaestina seems to have been hardly treated in the articles in " *The Garden* " last autumn. A dozen plants have given me flowers for two months and the display is not over yet. They vary from a yellowish green to a colour that is almost pale blue or turquoise, and each plant sends up two or three flowers in succession. I. galatica is also showing its colour and most of the tall Junos are already in bud. I have them planted in the open frame already mentioned, and the fact that the frame has no front enables one to grow little things like Danfordiae full in the sun with shelter overhead in bad weather. It is grateful for this protection, and the flowers have lasted quite three weeks in perfection.

An Iris Garden in Winter.

(" *The Gardeners' Chronicle*"—*March 22nd*, 1913.)

There is not much that can be said in praise of the winter climate in Southern England, and yet the fact that it is unusually cold and mild by turns seems to induce plants from climates both colder and warmer than our own to behave as they would in their homes. If we had long periods of continuous frosts in winter, we should certainly be unable to grow many irises from the warmer regions, as, for instances, the Californian species, which Dr. Britton tells me he is unable to grow in New York, while, if frost were almost unknown, the species from the colder regions would be unable to rest in winter and would exhaust their energies in constant leaf growth. This happens in the Azores where many irises remain flowerless even if they manage to exist.

Observation of the behaviour of plants of many species of iris seems to show that the climate-character—if such an expression may be coined—of each species remains constant here. It shows, further, that there are certain laws governing their behaviour which may be used to determine to a certain extent the habitats of plants of unknown origin. These laws cannot, of course, give us positive proof that the plant in question comes from a particular country, but they do seem to enable us to eliminate the countries from which it cannot come.

There appear to be four main types of climate-character among irises—the alpine, the mild-winter, the hard-winter and the Central Asiatic.

The alpine class includes those irises whose flowers develop as soon as or almost as soon as, the leaves, and whose leaf-growth is of comparatively short duration. This class is confined to the bulbous species of the Reticulata and Juno groups and it is interesting to notice that of both these groups odd species seem to have strayed away from the natural habitat and to have become weak and effeminate under the influence of the enervating climate of the lower levels. Thus I. reticulata itself from the Caucasus is perfectly hardy here and so is I. histrioides from the mountains near Amasia. Both of these increase rapidly by seeds and offsets in suitable soil, provided always that they escape fungoid attacks. I. histrio, however, from southern Asia Minor and I. Vartani, which may be looked upon as the southernmost form of histrio, coming as it does from the neighbourhood of Nazareth and Jerusalem, are much less hardy, and tend to lose their alpine character by developing their leaves before the flowers appear. Of the Juno group the effeminate stragglers are I. sindjarensis and some of the small persica forms such as I. issica. Sindjarensis comes from the low hills in Mesopotamia and shows its debility in that after flowering the plant has seldom sufficient strength to form a bulb of flowering size for the following year. It splits up into several small bulbs which take several years to reach flowering size. I. bucharica on the contrary is a hardy mountaineer from Bokhara and each flowering bulb leaves two or three full-grown descendants to replace it next year.

A noticeable feature of these alpine species of iris is that the flowers are able to resist hard frosts. Fragile as they may appear, the flowers of the galatica form of I. persica and of the white form of I. orchioides have recently passed unharmed through several very sharp frosts. This resistance to cold is doubtless a character acquired in their alpine homes, where night frosts must be common at flowering time.

Those species of iris which show either the mild-winter or the cold-winter character are by far the most numerous. Species from regions which have a mild, moist winter begin to grow in autumn and have foliage of some length in winter, while those from more rigorous climates lose their leaves entirely in autumn and lie dormant until the spring. Some of the latter by developing their flowers rapidly—*e.g.*, I. pumila—would seem to approach the alpine section but they differ in that their foliage develops slowly throughout the whole summer. I. pumila is, in fact, a characteristic cold-winter iris, and may be contrasted with I. chamaeiris, which has leaves of some length in winter, and of which, imported plants are often killed here by sharp frosts though seedlings tend to become acclimatised and to gain in hardiness.

Other similar pairs of species are I. aphylla from Bohemia and Hungary, which is leafless in winter and quite hardy, and I. sub-biflora, from the Portuguese coast and southern Spain, which is evergreen and tender, I. variegata, from Hungary and the Balkans, and I. germanica, of whose habitat it can only be said that it cannot be Germany, because the foliage grows in the autumn and because the flowers are only too liable to be nipped in the bud in March or early April. I. germanica is probably a native of the Mediterranean coast which has gradually spread by human agency. If we accept the theory which is here put forward, we shall not hesitate to say that the forms of I. germanica, which are now common in Srinagar and in Khatmandu, must have been introduced from the west, for their climate-characters are those of mild-winter irises, and entirely unlike those of the undoubted Himalayan species, which behave like those of the Central Asiatic section.

Among the Apogon Irises there are many examples of both mild-winter and cold-winter characters. Thus I. longipetala, I. Douglasiana, I. Purdyi, and other species from the Californian coastal region are evergreen here, while I. missouriensis, from the mountainous region in which the Missouri rises, is practically only a form of I. longipetala, which behaves as a cold-winter plant. The flowers of the two species are almost indistinguishable.

The difficult question of the various forms of I. spuria and I. halophila has some light thrown upon it when we examine the plants in winter. From Hyères, Vendée and Hérault, come slightly varying forms of I. spuria, but all agree in having leaves of some length in winter, as have also the ochroleuca group from western Asia Minor.

I. halophila, however, from Central Asia, loses its leaves entirely, and in winter only shows a few short, sturdy leaf tips, which look capable of standing any degree of cold. In view of this fact, I am inclined to believe that plants that are now common in Kashmir, I. aurea and a beautiful blue form of I. spuria, closely resembling, if not identical with, Foster's Monspur forms, are really introductions from Western Asia and not indigenous to their present habitats. All the Sibirica group are cold-winter irises, but it is instructive to notice the different behaviour in winter of I. fulva and I. hexagona, from the swampy ground near New Orleans, and of I. foliosa (La Mance's form of I. hexagona) from the Osark Mountains in Arkansas. The latter reserves its energies for the spring in summer, and then flowers readily, while the two former battle with our winters, often get the worst of the contest, and remain flowerless in summer.

Typical Central Asiatic irises are not common in our gardens. I. halophila, which has been contrasted already with I. spuria, is an approach to the type, but the flowers develop at a much later stage of the growth of the plant than do those of characteristic examples. In such species, however, as I. kumaonensis, I. Hookeriana and I. nepalensis, growth commences about the time when, in their homes, the plants would begin to feel the influence of the warm and moist south-west monsoon. The flowers develop rapidly and are over before the leaves have attained to any considerable size. I. ensata ought to behave in a similar way, but for some reason or other it usually wakes up too early in the year in our mild winters. In its native home in Central Asia the flowers appear while the leaves are still quite short, as many herbarium specimens prove, but here a spell of mild weather in January or February induces it to send up growths which are checked or even destroyed by late frost. Flowers are therefore seldom numerous here except in sheltered positions, but in Asia when once the change from winter comes, frost is probably unknown, and the flowers are accordingly numerous.

As might be expected the alpine and the cold-winter irises are those which do best with us. The mild-winter species will always be disappointing, and our loss must be great, for these latter include all the larger Oncocyclus irises, and also some of the finest Pogonirises, such as I. cypriana and I. Ricardi (mesopotamica). Of these latter some magnificent hybrids have been raised by using the pollen of the best of the so-called German irises. They were produced in the south of France, and are extremely large and handsome, but, unfortunately, experience of their behaviour during the last two or three years seems to show that they have the inherent weakness, in our climate, of typical mild-winter irises.

Some Garden Irises.

(LECTURE.)

(*Journal of the Royal Horticultural Society—November*, 1914.)

It would obviously be impossible in the short time at our disposal to give anything approaching an adequate account of all the irises that our gardens now contain. I propose, therefore, to deal primarily with certain groups of irises among which confusion seems to prevail, and as we pass from one group to another to bring to your notice some of those irises which are still rare in cultivation, either by reason of their recent introduction, or from what appears to me to be unaccountable neglect. It may be that I have quite unreasonable prejudice in their favour. I probably have.

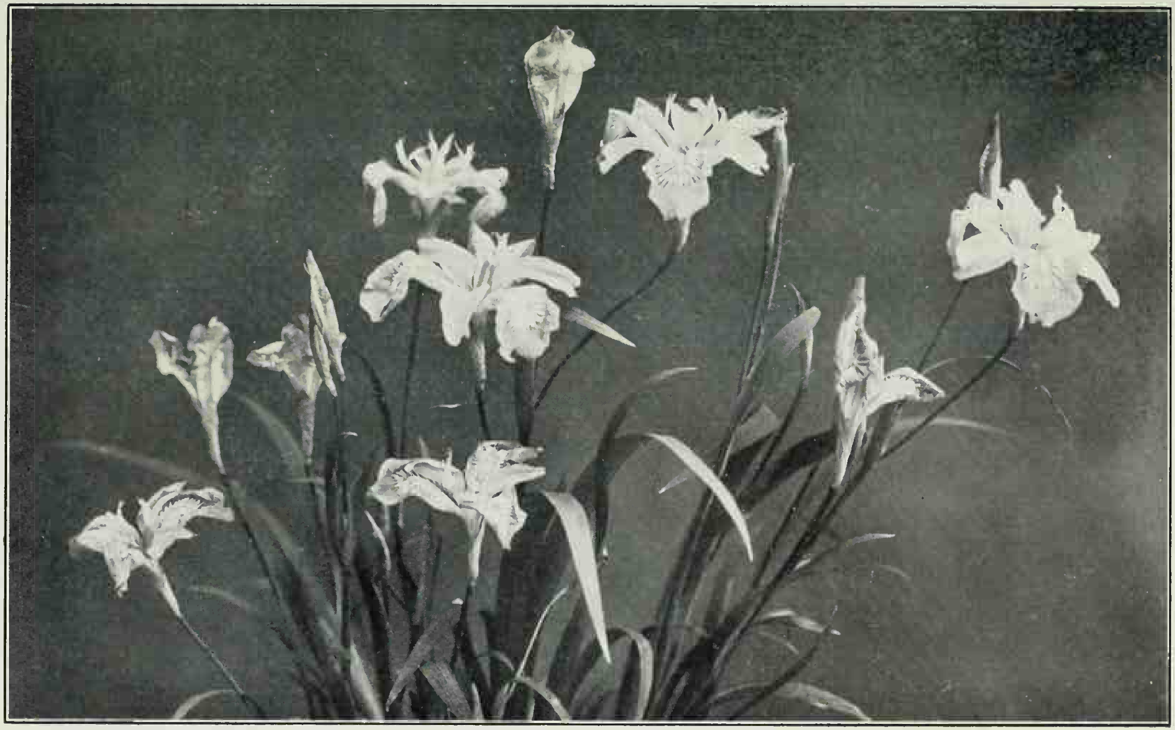
The first irises, then, to which I propose to draw your attention are the three which appeared in this Society's list of plants for distribution at the beginning of this year. They serve to illustrate the fact that gardeners have—and indeed must have—tenacious memories for names, though the mental processes by which the names have become attached to the plants will not always bear logical analysis.

The first of the three names on this list is that of Iris germanica. It may be a paradox, but the only two facts on which I feel justified in insisting with regard to this iris are, firstly that it is not a native of Germany, and secondly that of the vast series of plants which we find under this heading in catalogues and garden lists only a very small proportion have anything whatever to do with Linnaeus' species I. germanica.

Of all the twenty or thirty irises known to Linnaeus this is perhaps the most difficult to identify. If we had only his short Latin diagnosis, we should be utterly unable to decide to which of the number of plants he gave the name. Fortunately he quotes his authorities, and by inquiring into the sources of his information, as well as by the process of eliminating those species of which his descriptions are more definite and adequate, it is possible to arrive at a definition of I. germanica. This can be checked by comparison with the dried specimen which is still preserved in his herbarium at the Linnean Society here in London. Of colour there is of course no longer any trace, and since such words as purple, lavender, lilac and violet convey such different impressions to different individuals we cannot be certain which of several colour-forms Linnaeus had in mind.

We may, however, define I. germanica as a rhizomatous bearded species, with a branching stem, which in its typical form seems to produce four flowers, though a fifth may often develop immediately below the terminal head of two flowers. Apart from the inflorescence, the characteristic features seem to be the spathe-valves, which are half scarious at flowering time, the presence, usual, but not invariable, of scattered hairs at the base of the standards on the inner side, the sharply three-sided capsule, the oval or pear-shaped and not compressed seeds, and the length of the perianth-tube, which measures about an inch. Lastly, and this is a feature to which I would specially draw your attention, this iris is evergreen or practically so. It does not wait until after the turn of the year before pushing up its new growths. These develop rapidly during the autumn rains, and in mid-winter I. germanica is at once noticeable among its relatives in any collection of irises.

It is precisely this characteristic habit of leaf-growth that shows us that the plant cannot be a native of Germany, or



IRIS GRACILIPES

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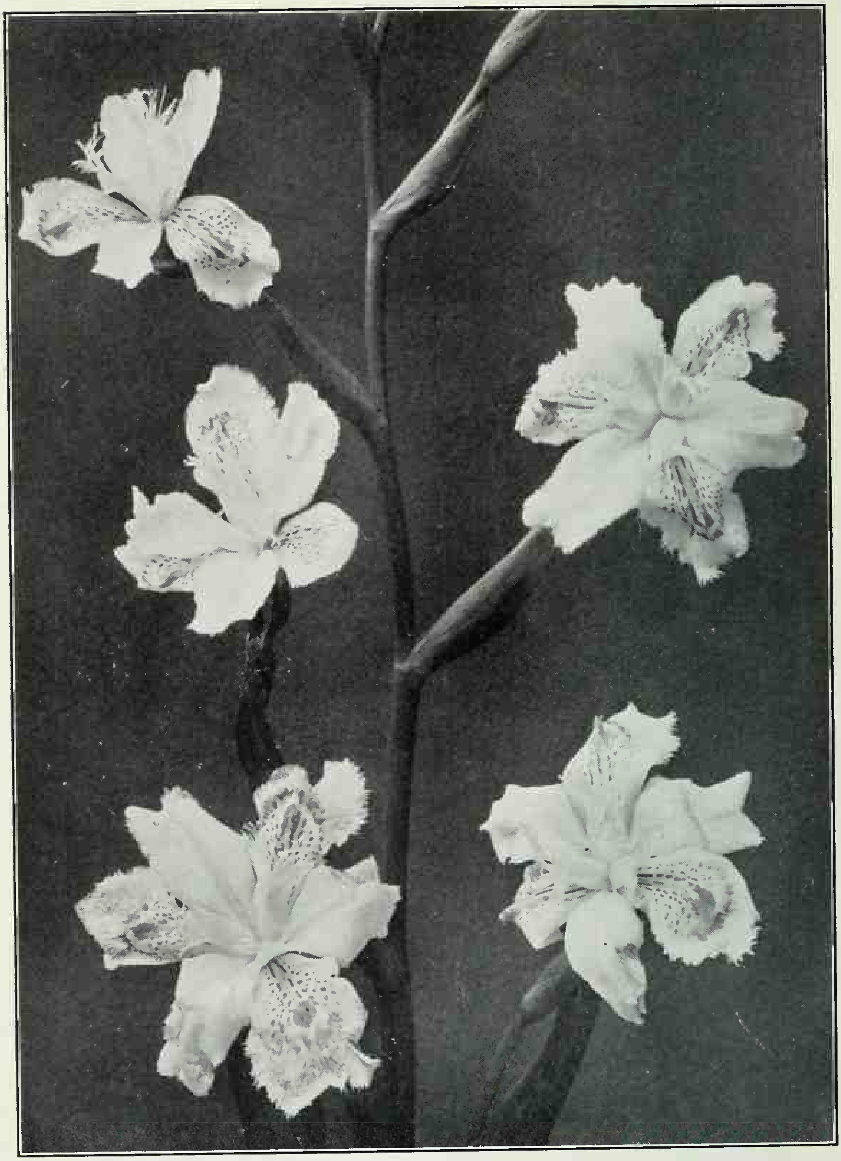


IRIS JAPONICA

See page 9 and index

indeed of any part of Central Europe. If you search in winter for I. aphylla (forgetting for the moment that its very name means leafless) or for I. sibirica, graminea, pumila or variegata, all of which are undoubtedly natives of Central Europe, you will have some difficulty in seeing even the merest tips of the leaves above the surface of the soil. All are adapted to resist the rigours of the Continental winters, and have learnt to restrain their energies in the direction of leaf-production until the worst of the weather is over and spring is at hand.

Here it may be well to digress for a moment to notice the confusion in our gardens between I. pumila and I. chamaeiris. The former is comparatively rare, but may be known at once by being leafless in winter, by the almost complete absence of stem, and by the long perianth tube. It is a native of Austria and Hungary, and stretches round the north side of the Black Sea to the Caucasus, all districts with rigorous winters. I. chamaeiris, on the other hand, starts into growth just as does I. graminea in autumn, and it is no surprise to find that it is confined to the south of France and to Northern Italy, where the winters are comparatively mild. It should be readily distinguished from I. pumila by its habit of growth, by its stem and by its relatively short tube. We may notice, too, that the only known iris from Arabia, namely, I. Madonna, and its albino form, I. albicans, both retain their leaves in winter, just as does I. germanica.

If we compare the growth and habits of I. germanica with those of the species already mentioned, we shall be forced to the conclusion that I. germanica is a native of Southern Europe, or of some part of the Mediterranean basin. The question of its origin is indeed complicated by the fact that the form which we know as atropurpurea or " Purple King " was described as I. nepalensis by Wallich and is in cultivation in Nepal, while the well-known variety " Kharput " which Foster received from the town of that name in Asia Minor, has long been naturalised near Srinagar in Kashmir. It also, curiously enough, decorates the Guards' Monument at Sebastopol, and only last year I found that it is the common form of I. germanica at Mostar in Herzegovina. That I. germanica could have an Indian origin would seem to be very improbable, since such undoubtedly native species as the real I. nepalensis of Don and I. kumaonensis lie entirely dormant for several months in winter, and even until late in spring, as indeed the climatic conditions would lead us to expect.

A consequence of this southern origin of I. germanica is that it is not absolutely hardy here in England. Complaints that "Purple King" flowers but shyly are often due to the fact that the late spring frosts destroy the embryo inflorescences before they have emerged from the leaves. The brown decaying remains can often be found by dissection enclosed in the tufts of leaves although it is but poor consolation to have our theory of the origin of the plant confirmed in this negative fashion.

Still more important for our purpose is the further consequence that it is extremely rare that any form of I. germanica ripens sound seed in England, or, indeed, as far as I can gather, in Germany or even in the south of France. I. aphylla, I. variegata and I. pallida on the other hand, all mature seeds readily, and this fact, together with the results of raising a number of seedlings from them, confirms me in the belief that our common garden hybrids are to be traced, not to I. germanica, but rather to I. variegata, from which they certainly derive their yellow tints, and to I. pallida, with its more complicated inflorescence.

We may notice in passing that the names "squalens" and "sambucina" in all probability only denote two of the almost innumerable hybrids of I. variegata and I. pallida and have themselves no specific value, although the name squalens may serve as a useful label to denote those plants in which the yellow of variegata and the blue-purple of the other parent struggle for the mastery and produce shades of colour which may well be called muddy or squalid.

Since these notes were written on a winter evening, when time was a little less scarce than it is at this time of the year, the flowering of some plants which I found last year on the Dalmatian coast has afforded striking confirmation of this theory of the origin of our garden hybrids misnamed German irises.

A few years ago there was discovered on the top of a mountain some 4,000 feet high in the Velebit range in Croatia, within a mile or two of the coast as the crow flies, an iris which I did not recognise when Dr. Degen, of Budapest, was so good as to send me dried specimens. It appeared to be either a yellow form of I. aphylla or some new species. By the kindness of the late Herr Dobiasch of Zengg, who provided me with a native guide and to whose memory I wish to take this opportunity of paying tribute, I was able in April, 1913, to see this iris in its native home. It was a stiff climb up from the coast over the roughest and steepest of limestone hills. As I had been travelling all night by somewhat primitive means of conveyance, and as it was pouring with rain, I was beginning to wonder as we neared the top whether it was worth while to persevere, when I was cheered by the sight of a few iris leaves among the rough limestone of the slope that faced the Adriatic and the island of Pago. My guide urged that it was not worth while to stop to collect any of these plants, as we were close to the cup-shaped hollow near the summit where the iris of which I was in search was known to grow. However, I dug up a few of them, and am now very glad that I stopped to do so, for they have turned out to be a small pallida of the same description as those which were first described as I. illyrica, to which the well-known I. Cengialti is closely allied, if indeed, as I am inclined to think, the one is not merely a local form of the other.

On reaching the hollow for which I was bound, I was rewarded by the sight of flowers on all sides ; patches of Gentiana tergestina, which is closely allied to G. verna, a yellow primula, crocuses of a species which has not yet been determined, varying in all shades of colour from white to purple, and coming up through the gentians and among the crocuses, the short immature leaves of an iris. The soil was a black, almost peaty vegetable mould, very different from the scanty but strong reddish soil, familiar to all those who have dug plants out of the limestone hills of Southern Europe. Snow was still lying in patches, and no signs of flower stems had yet developed on the irises. However, I brought home a number of plants for my garden, and for that of a friend for whom I was also collecting. In May of this year they have flowered freely.

These plants from the hollow at the top comprise at least two irises, namely, I. variegata, with pure light yellow standards and red-brown veins on the falls, and another which is obviously a natural hybrid between I. variegata and the I. illyrica which has just been mentioned as growing in the immediate vicinity. The latter, being a pallida, has spathe-like valves that are wholly dry and scarious at flowering time ; those of I. variegata are entirely green, while those of the hybrid are green at the base and scarious in the upper part. The latter is identical with those numerous hybrids which have long been common in gardens under the names of squalens and sambucina.

Of the newer hybrids I cannot too strongly recommend as good border irises " Iriskönig," the best of the variegatae, " Oriflamme," which is nearly a pure germanica and an improvement on macrantha, " Black Prince," which is specially valuable for its deep velvety flowers and for its late-flowering habit, and "Isoline," of which I suspect one parent to have been I. trojana. To those who wish to raise hybrids I would specially recommend the latter, for it has already given me one seedling which produced a spike containing no less than fifteen flowers.

Other pleasing hybrids may easily be raised by crossing pallida with pollen of I. Cengialti and of its variety "Loppio." The resultant plants mostly give us the clear shades of purple with the habit of a smallish pallida, not infrequently with the addition of a deep golden beard, which sets off a strikingly handsome flower.

We will now pass on to the second iris on the list, which appears as I. laevigata, *syn.* I. Kaempferi. These two names have long been in horticultural use, but their association only serves to perpetuate an obvious confusion. One would have thought that even the most rapid consideration of the common Japanese Irises would have driven us to question the suitability of the name laevigata, which means "smoothed." Their leaves are rough, with a prominent central rib, the seeds are wrinkled, the petals crimped, and indeed it is hard to see what feature could possibly have suggested the name.

Like several other plants which we associate with Japan, such as I. japonica, which comes from the hills near Ichang in Central China, I. Kaempferi is a native of China and grows wild in the marshes along the Amur. In its natural state it appears to be always single, and there is no accepted explanation of the means by which the Japanese have evolved from it the long series of double, distorted and even bloated hybrids with which the student of Japanese art has long been familiar. In the natural state the colour is a deep red-purple though albino forms most undoubtedly occur. In the famous ditch which runs through the lower corner of the Wisley garden, I. Kaempferi has now been growing for many years since Wilson first planted there importations from Japan. Innumerable seedlings must have grown up there in the course of time, and it is interesting to notice that the self-sown reversions to the single wild form of a uniform red-purple or white now far outnumber all the other forms to be found scattered among them.

I. laevigata is also a native of the Amur marshes and may easily be distinguished by its foliage, which is smooth and has no prominent central rib, and by its large smooth polished seeds, which closely resemble those of our native yellow water iris, I. pseudacorus. The colour is purple, usually of a blue, but sometimes of a red shade, with a narrow central streak of yellowish white. Good forms of this species are, I think, undoubtedly among the finest blue irises that we possess.

Curiously enough, this iris also first reached us from Japan in the form of a quasi-albino variety, which came to Kew mixed with I. Kaempferi, and which was separated by Mr. Baker and described as I. albopurpurea. We must accordingly reduce this name to I. laevigata *var.* albopurpurea, and try to realise that the two names laevigata and Kaempferi represent two totally different species. Among collected material now preserved in herbaria, I have found no evidence that natural hybrids of these two species occur, and efforts to cross them in the garden have so far proved futile, though I should be the last to attach any great value to such purely negative evidence. Of the conditions that determine the fertility of an iris little is known, and after succeeding quite unexpectedly in crossing a bearded Pogoniris with a crested Evansia, although many previous efforts had always resulted in failure, I am inclined to think that it may not be impossible to cross any two members of the genus.

In this connection, may I suggest to the hybridiser the interest that would attach to a hybrid between a bulbous and a non-bulbous species? Unless outward appearances are very deceptive, I am inclined to think that the point of contact, and consequently the greatest hope of success, lies in the neighbourhood of I. xiphium, and I. spuria. The flowers of these two species are curiously similar in shape, and we must also remember that the former sometimes, though rarely, produces one or two vertical lateral branches in the axils of the leaves precisely similar to those that we find in I. spuria. They are also still to be found growing wild in the same region, for they both occur in Spain and in North-west Africa. Moreover, I. xiphium has been recently rediscovered on the French coast, between Marseilles and the Spanish frontier, where I. spuria is also not unknown.

If repeated attempts are made to cross these two species, sooner or later one may succeed, and the interest will then be to see what kind of rootstock the plant will form. The resultant plant might perhaps throw some light on the question whether the bulb arose from the rhizome or the rhizome from the bulb, or whether both have been evolved from a common ancestor.

We must now pass on to the third name on our list, namely, I. sibirica orientalis, which may perhaps have been intentionally compounded to describe a hybrid between two species, for I. sibirica and I. orientalis are totally distinct. The former is, I believe, confined to Europe east of the Urals, between which and Lake Baikal there occurs a gap before I. orientalis begins in North-eastern Asia. I must admit in passing that there is apparently in Corea a puzzling plant which seems in some dried specimens to be merely I. orientalis, but which in other cases comes very near to being a dwarf, large flowered sibirica. I live in hopes of eventually obtaining seed of wild plants of this Corean iris, for I have always had some doubt about the authenticity of reputed specimens from Corea which I have grown from time to time. I. sibirica and I. orientalis are totally distinct in habit, and, what is even more important, have entirely dissimilar seeds and seed-vessels. Both have hollow stems, and narrow, almost grassy, foliage. Here, however, the likeness ends, for the spathes of sibirica are entirely scarious while those of orientalis are wholly herbaceous. The capsule of sibirica is broad, rounded and inflated, and the seeds large and flattened, while in the case of I. orientalis the capsule is much narrower relatively to its length and the seeds are much smaller, with a tendency to be cubical.

Of both species albinos are common, and the well-known and beautiful " Snow Queen " is a typical albino form of I. orientalis. It breeds true to the white colour, which acts as a Mendelian recessive.

The rehabilitation of Thunberg's I. orientalis as a good species is fortunately rendered possible by the evident confusion that underlies Miller's iris of that name. The latter is said to be bearded, and yet the figure is that of some member of the spuria group. In view of this confusion in the original description, we are able to keep Thunberg's name of I. orientalis for the relative of I. sibirica, and also to restore to a well-known and stately garden plant, the appropriate name of ochroleuca.

Both I. sibirica and I. orientalis have great possibilities for the raiser of seedlings. Some of these are more floriferous and vigorous than others, and the shade of blue in the flowers is also apt to vary. The finest sky-blue shades may be obtained by crossing I. orientalis with its albino forms, while the stature and habit of I. sibirica may be combined by hybridisation with the larger flowers of I. orientalis.

With the recent introduction of two yellow-flowered relatives from Western China, I. Wilsoni and I. Forrestii, the possibliities are still further increased, and I have already obtained some very pleasing results, in one of which the yellow of I. Wilsoni is distinctly visible at the base of all the segments of a pale blue flower.

It is impossible to pass from the sibirica group without mentioning what is perhaps the finest plant of all, namely, chrysographes, to my mind one of the best of many beautiful Chinese plants we owe to Mr. E. H. Wilson. In its best forms it is really magnificent, and I shall never forget the experience of watching the first flower unfold, and of seeing for the first time the brilliant golden markings on the rich velvety deep purple-violet falls.

Before I conclude these notes, may I venture to put before you a point which I had hoped to be able to illustrate to you more fully from living specimens. It concerns a confusion which has arisen around the name of I. filifolia. The true plant is still rare, though I hope that several hundred seedlings which I have raised will soon have all reached flowering size. The plant is found in North-west Africa and in Southern Spain, and I considered myself very lucky when I obtained a few bulbs and some seeds through the kindness of a friend at Gibraltar, who, owing to his official position, was able to obtain them for me from a station near the top of the rock, where it grows almost inaccessible in a part to which visitors are not admitted. The colour is a rich red-purple with a central yellow blotch, round which the juxtaposition of the purple and yellow produces a kind of bluish halo. What I particularly want to point out is that a large and early form of I. xiphium which the trade dealers have put in their lists for years as I. filifolia has nothing whatever to do with that species. The difference is at once apparent in the long slender perianth-tube of I. filifolia, the false plant having only the short funnel-shaped tube of I. xiphium.

Those with whom Spanish Irises succeed cannot do better than obtain a supply of the pseudo-filifolia, which might be more appropriately known as I. xiphium *var.* praecox, from its early-flowering habit, and cross the flowers with pollen of the best of the older Spanish Irises from which early blooms have been obtained under glass. The result will be a series of large-flowered forms, similar to, and I believe, identical with those which have been introduced under the name of Dutch Irises during the last few years.

Those whose gardens are sufficiently warm and sheltered to be able to flower I. tingitana might use this to obtain an even finer series, for the few known hybrids of this magnificent iris with I. xiphium have the size and brilliance of I. tingitana and almost the hardiness of the other parent. It is interesting to note, too, that the long perianth-tube of I. tingitana is neither dominant nor recessive, in Mendelian phraseology, for the resultant hybrids have a short linear tube, and so stand half way in this respect between I. tingitana and I. xiphium. At the same time the flowers closely resemble those of I. tingitana, while the plants are as early as that species, hardier and more floriferous.

In conclusion may I ask your pardon for leading you into much dry detail. My only excuse is that to me, at any rate, my flowers have become the more interesting the more closely I have examined them and the more searching the inquiry I have tried to make into their origin and history.

Garden Irises.

(" *Country Life* "—*July 4th*, 1914.)

The Iris family contains so many and such varied members that there can be no English garden in which some may not be grown with success. With a little trouble indeed, it is possible to grow more or less, well, nearly every member of the genus that can be obtained, though in any particular case it will doubtless be necessary to make up special beds for some of them, to cover others with lights to keep them dry after flowering or to provide others again with moisture at the roots by some sort of subterranean irrigation. These notes will aim at showing which groups of irises are best suited for gardens on different soils, and it is hoped that those who desire to grow representatives of the whole genus may find in them some hints which may help them to provide for their various needs.

We will begin by dividing the genus into those species whose root-stock is a bulb and those which form the well-known creeping stems or rhizomes. With the single exception of Iris xiphioides, which comes from Pyrenean pastures where moisture is abundant, all bulbous irises prefer a dry, warm soil, and consequently, on cold, moist ground, the only hope of continued success with them is to lift the bulbs annually when the foliage dies away, store them in sand or dry husks until September or October and then replant them in well worked soil where the drainage is as good as possible. I. xiphioides is often known as the English Iris, not because it is a native of this country, but because several centuries ago, when Bristol was an important harbour for ships trading to

Spain and France, bulbs of this species reached that town and were sent from its neighbourhood to the Continent. In the wild state the colour is usually a deep violet-blue, but in cultivation all shades of colour from this to white, through mauve and pearl grey, have been obtained. There is a central yellow line of the falls, but no wholly yellow form of I. xiphioides is known to occur. This is found, however, in I. xiphium, the Spanish Iris, of which both yellow and purple forms occur in the wild state, while under cultivation every possible combination of the two colours seems obtainable. Those who are attracted by the rarer and more difficult plants may try in a warm corner, I. tingitana, a glorified early " Spanish " Iris from Tangiers ; the bearded I. Boissieri from the Gerez Mountains in Portugal and the golden I. juncea from Tunis and Algeria.

Among other bulbous irises, the Juno group is not nearly as well known as it deserves to be. It is true that some of its members such as I. persica or the Afghan I. Fosteriana with its yellow falls and drooping purple " standards " are difficult plants to manage, but it would be hard to find a better garden plant for any well drained soil than the April-flowering I. bucharica. Like many Bokhara plants, such as Ixiolirion and Fritillaria pallidiflora, I. bucharica has the good sense to remain underground until the worst of the winter is over, and is therefore far less tender than the Mesopotamian I. sindjarensis, which, when it has flowered once needs several seasons to build up flowering bulbs from the remaining offsets. The growth of I. bucharica reminds one of a young plant of maize, and each stem produces from five to nine flowers in succession from the axils of the leaves. The colour is white and clear yellow, and the successive flowers make the plants decorative for at least a month. The special virtue of the plant seems to be that it increases very freely from offsets, which are almost invariably of sufficient strength to flower the next year. Closely allied to I. bucharica are I. orchioides, with flowers of deep golden yellow, and having an albino as well as a pale blue form, coerulea, which is probably a hybrid, and I. warleyensis, with small but very richly-coloured flowers of deep violet with a yellow blotch.

A small group of bulbous irises, which should be represented in every garden, is known to most in the form of I. reticulata, from the Caucasus. Allied to this there are other species in Asia Minor, Syria, and Mesopotamia, all of which give great pleasure in the early days of the year, either in sunny corners in a rock garden, or in the shelter of an airy frame, where the bulbs can be kept dry when the flowering season is over. The smallest of them is I. Danfordiae, which is also distinguished by its yellow colour and by the fact that its standards have dwindled to mere bristles, while the largest and one of the most beautiful is I. histrioides, from the neighbourhood of Amas or Amasia in northern Asia Minor. This group has one great enemy—a fungoid disease, of which the first signs are inky blotches on the bulbs. The remedy is an annual lifting of the bulbs, which, when they have become thoroughly dry, should be soaked for two hours in a solution of formalin of the strength of one part to three hundred of water. The bulbs may then be replanted, for they only deteriorate when kept out of the ground for any long time.

Passing now to the rhizomatous species, we shall find that, as a general rule, the Pogoniris, or bearded kinds, do best in a heavy soil containing lime, while the Apogons or beardless kinds dislike lime and prefer a loose soil rich in humus. The chief exception to this rule is, perhaps, the spuria group, to which belong such stately border irises as I. ochroleuca, white and yellow and I. aurea which, in its various forms, stretches from Spain and Algeria along the shores of the Mediterranean, and then by way of the Caucasus and Persia right away to Kashmir. Related to these is the little-known I. graminea, whose flowers have the scent of a ripe greengage on a warm wall. This group does best in a rich heavy loam, and is always more vigorous in a stiff than a light soil.

While it is undoubtedly true that the bearded species of iris do best in a heavy soil, it must not be forgotten that they all come from regions where the summers are both hotter and drier than the average English summer. This suggests a period of drought in summer, and we must therefore do our best to obtain this for them, either by planting them on sunny slopes, or, if our gardens are level, by throwing up banks or mounds where the drainage will be good, and on which the irises will consequently luxuriate. When I remember the various visitors to my irises who have singled out for praise plants which were mentally marked out for the bonfire as soon as the flowers should be over, I hesitate to draw up any list of desirable varieties of bearded irises. Perhaps, however, I may mention some of my own favourites, and trust that some at least of them will find favour with others.

Any form of the true I. pumila is desirable, but it is a rare plant. It is extremely variable in colour, and is known at once by the entire absence of stem and by the long perianth tube. It flowers in April, and in heavy, well-drained soil flowers so abundantly that the blooms entirely hide the leaves. Its name appears in many catalogues, but the plant supplied in its place is usually I. chamaeiris, from the south of France and North Italy. This produces a stem of varying length from two to six inches and is an admirable plant for an edging to borders. The range of colours is large and as the names vary in different gardens, we must either select the colour that appeals to us regardless of the name, or, better still, beg seeds from a friend and make our choice from the resulting plants.

A little later than these comes I. aphylla, a Central European species, characterised by the entire loss of its leaves in winter and by the branching stem which forks below the middle, often at the very ground line. The flowers are of varying shades of purple, and there is a very sweet-scented form which has flowers of a curious grey shade irregularly mottled with purple. Of the various varieties of the true I. germanica, the best of the blue-purples are the common so-called type of our English gardens, Fontarabie, Amas or macrantha, and, for the late-flowering form, a recently-introduced plant from Askabad. Red-purple is best represented by the dwarf Kochii and the tall Kharput, which by some unknown means has run wild in Kashmir.

Of early yellows, the best are I. imbricata, from the Caucasus, and a yellow form of I. Alberti, which is a Turkestan plant. These, however, are still rare, and their place is usually taken by the somewhat later flowering I. flavescens, which is, almost certainly, not a species at all, but a garden hybrid of I. variegata, a Central European and Balkan plant with yellow standards and purple-veined falls, which is one of the most common parents of many of our ordinary bearded irises. The other ancestor of these latter was probably I. pallida, and on the whole I am inclined to prefer the self-coloured flower of the various forms of this species to the parti-coloured hybrids which have resulted from its union with I. variegata. An albino pallida exists, but it is rare, though forms in which the flowers are white with pale purplish veins round the edges of the segments are fairly numerous. The best known is perhaps Mme. Chereau, but the newer Jeanne d'Arc is, to my mind, far more pleasing. Other good hybrids are Prosper Laugier, deep fawn and rich red-purple, Edouard Michel, a self-coloured purple, Black Prince, with very rich velvety flowers, Caterina, a pale lavender blue, and Oriflamme, which is an improvement on the well-known macrantha form of I. germanica.

Of white bearded irises there are several, for each variety of I. germanica seems to have its albino form. One of the best known is florentina, of which the purple counterpart is used together with I. pallida to make orris-root in the neighbourhood of Florence. But there are several others that are even better. The best I found near the roadside between Matuglie and Monte Maggiore in the neighbourhood of Fiume. Of an even purer white than any of these albino germanicas is the white form of the Arabian I. Madonna, which is known in our gardens as albicans, and which owes its almost universal distribution in the south of Europe to the fact that the Mahommedans have taken it everywhere with them and used it as an ornament in their graveyards.

Of tall, late, purple-flowered, bearded species there are three or four known as trojana, cypriana, mesopotamica and junonia of which the types are still rare in our gardens, and of which hybrids with the older varieties give promise of new races bearing tall stems with many huge flowers.

The Oncocylus and Regelia group are all bearded irises, but they are plants for the expert and the enthusiast. They need all the warmth and sun we can give them, and must have drought after the flowers have faded. They must therefore be lifted and stored under cover until autumn, or covered with glass and thus kept dry artificially. Hybrids between the two groups, known as Regelio-cyclus irises, are now obtainable and are perhaps easier to manage than their parents.

The Apogons or beardless irises are the mainstay of those who garden in a sandy soil, and the addition of leaf soil or old, well-rotted manure will be rewarded by finer and more numerous flowers. In dry localities it may be advisable to lay underground perforated drain-pipes, so that the sub-soil can be kept moist under the dusty surface, but this is only necessary for the sibirica group and for those species in whose leaves, when held against the light, we see numerous minute dots. These dots can be seen, for instance, in the English river iris, I. pseudacorus and are found also in such plants as I. setosa (Hookeri) from Siberia and North America. I. versicolor, the United States purple counterpart of I. pseudacorus, and the curious terra-cotta coloured I. fulva from the South-eastern States. I. foliosa is a near neighbour of this latter, and it is well worth growing for its large purple flowers, even though it tends to hide them among its abundant leaves.

I. sibirica with its narrow grassy leaves, tall hollow stems, and small blue or white flowers, is well known and so also is its Eastern relative, I. orientalis, of which one albino form has almost become equally well known under the name of Snow Queen. Less well known, however, are two yellow-flowered relatives, I. Forrestii and I. Wilsoni, recently discovered in Western China by the two collectors after whom they are named and to whom we owe so many fine additions to our gardens. Even more striking, perhaps, is another new Chinese species, I. chrysographes, of the deepest uniform violet-purple, relieved by a few gold veins at the throat. All these new species will hybridise with one another and with I. sibirica, and some very charming results have already been obtained. I. sibirica and its relatives do well in rich border soil, and even better in positions where their roots can get down to the water level of streams or ponds. The Japanese I. Kaempferi has many gaudy double forms, but they are capricious, and often will not flower unless they have been fed lavishly by top-dressing and liquid manure during the winter months, and unless they can send their root fibres down into the water during the summer. The wild species, however, and its albino form are much less exacting, and flower regularly and abundantly when the Japanese hybrids remain flowerless. With it may be grown the gorgeous blue I. laevigata, which has also an albino form, and others in which the white ground is mottled with blue (albo-purpurea). This species is distinguished from I. Kaempferi by the fact that its leaves are smooth and have no prominent midrib as have those of I. Kaempferi, and by its smooth polished seeds, which seem to indicate a relationship with our native I. pseudacorus.

A little-known but very beautiful group of irises comes from California and consists of I. macrosiphon, I. tenax, I. bracteata, I. Purdyi, I. Douglasiana and I. Watsoniana. The colour of the flowers is remarkably variable—so much so that no two seedlings are exactly alike. In a warm sandy soil the plants grow rapidly and are extraordinarily floriferous. To do well, however, they must be raised from seeds and put out into their permanent positions as soon as they have made about four leaves. They grow to a height of about eighteen inches. In heavy soil where these species will not succeed they may to some extent be replaced by I. longipetala, from the sea coast of California, by its mountain form I. missouriensis and by I. montana, sometimes known as tolmeiana, which comes from the Rocky Mountains. The Asiatic I. ensata appears to be allied to them and will stand more drought than any other iris. Its root fibres are thick and numerous and descend to a great depth, and when one has tried to uproot a well-established plant of this species, it is not hard to realise why it is that this iris is one of the few green plants that can resist drought in many localities in Central Asia. The flowers are small but numerous, often of a delicate grey blue, which harmonises well with the grassy glaucous foliage.

There are three golden rules which must be observed by all who wish to cultivate irises successfully. The first is that they must be grown in sunshine, with the exception of our native I. foetidissima and of the small group of crested irises, of which the small members, at any rate—I. cristata, I. lacustris and the daintiest of all, I. gracilipes—do best in half shade. The fine Chinese I. tectorum and its beautiful albino form do not seem to object to a position in which they are shaded by trees during part of the day, and I incline to think that the American I. verna, a beardless iris with the habit of a Pogoniris and the delightful scent of violets, must also have a similar position. The second rule is that irises should always be moved as they pass out of flower. They are then ready to make new roots, as the most superficial inspection will show, and have, when moved at this period, ample time to anchor themselves in the ground before the approach of winter. Lastly, irises must be planted shallow. The rhizomes of the bearded species especially should be on the surface of the soil, and not beneath it, for they seem to require the effect of the sun shining upon them if they are to produce their flower stems in the following year. The observation of these three rules goes far towards making iris cultivation a success, and their very simplicity ought to encourage some gardeners to embark on the more extended cultivation of the less common species of a genus which is very scantily represented in most gardens.

A Dalmatian Iris Hunt.

(" *The Gardeners' Chronicle*"—*May 17th*, 1913.)

The possibility of obtaining some light on the difficult problem of the various forms and varieties of Iris pallida, led me recently to undertake a journey down the Dalmatian coast, in spite of the warnings of various friends that war scares and mobilisation in Austrian territory might make travelling disagreeable. The term Dalmatian is convenient rather than correct, for my wanderings have not been confined to the province of Dalmatia, but have extended from Trieste and Fiume to Ragusa, and inland as far as Jablanica, on the road from Mostar in Herzegovina to Sarajevo in Bosnia.

After a warm spring day at Trieste in the middle of April, it was disappointing to have a rough passage in the teeth of a violent sirocco to Gravosa, the port of Ragusa, and to arrive there in cold, wet weather. However, I set out at once to search the hills behind Ragusa and Gravosa, for I had heard reports of a pale lavender iris on the rocks above Ragusa, and wondered whether I should find the fine plant that we all know as I. pallida dalmatica. As it happened, I did not go direct up the hill behind the town, but walked round the base to the north-east side of the ridge, where I could find nothing but Tulipa sylvestris, various orchids, and a dark striped fritillaria which I did not recognise. The nearest approach to an iris was Hermodactylus tuberosus, which is sometimes known as I. tuberosa. The flowers were over, but the curious drooping seed vessels and the characteristic foliage were easily recognisable.

Having crossed the ridge to the slopes behind Gravosa, I came into the neighbourhood of vineyards, and soon found several clumps of an Iris pallida which, to my surprise, was neither the supposed type nor the variety dalmatica, but closely resembled the forms which I have received from the neighbourhood of Riva and Roveredo, and also those produced by crossing the type with I. Cengialti.

The fact that irises only occurred on the slopes above the town led me to think that they might have escaped from cultivation, and I determined to explore further the next day. I therefore started out along the slopes above the town towards the south, and finally climbed over the ridge to the east. Once more it appeared that irises only occurred on the western side near cultivated areas, and after several hours of wandering on the other side, it seemed that after all no large irises could be considered certainly wild in the neighbourhood of Ragusa.

One of the peculiarities of the limestone formation of this region is the way in which streams appear and disappear again below the surface. Of this phenomenon there is a good example in the Ombla, near which I then found myself. I therefore went down into the valley and across to the point where the river issues in two or three streams at the base of a cliff which towers almost perpendicularly to the height of some eleven hundred feet. The river, as it issued from the rocks, forms a stream at least sixty feet wide. On the rocks just above one of the mouths, I saw an iris, and on looking up the cliffs was amazed to see purple patches on every ledge. The rest of the afternoon I spent in climbing about on the cliffs, uprooting a plant here and there, taking, as far as I could, those that illustrated the range of colour from pale to deep red and blue-purple. It was astonishing to see the range of colour in what must, I think, be undoubtedly a wild habitat. All the time I was on the look-out for an albino plant, for I have always suspected that this must exist to account for various garden forms grouped under the name of plicata. My expectation was not disappointed, for I found one clump of such an albino, which closely resembled—if indeed it was not identical with—the plant grown in gardens as Innocenza. Some plants were almost, if not quite, as pink as Queen of May, and some had yellow and some white beards. The foliage was comparatively narrow and dwarf, and it was certainly disconcerting to find nothing in the least resembling the type.

The fact that this cliff facing south-west was covered with what must be wild plants, makes it quite possible that the parallel ridge on which Ragusa lies may likewise have been an original home of this form of Iris pallida, or it may be that plants now found in the neighbourhood of Ragusa and Gravosa are descendants of some that came originally from the cliffs that tower above the source of the Ombla. It is perhaps worth recording that the white iris cultivated in this district is I. albicans. I saw no white forms of I. germanica here.

On the next day I took the train from Gravosa and went inland to Mostar, which is still essentially a Turkish town. My object was to get up on to the Velez Planina, the highest ridge (between 5,000 and 6,000 feet) in the neighbourhood, for on this mountain I knew, from herbarium specimens, that Iris Reichenbachii has been found. As the whole country was mobilised and all the forts on the hills full of troops, it seemed advisable to report myself. An interview with the general in command of the fortifications supplied me with leave to botanise in the surrounding country, on condition that I did not sketch or photograph, and that I would stand still and flourish my document if challenged by a guard. Armed with this document, I set out accordingly the next morning hoping to find I. Reichenbachii, but was greatly disappointed to see, after climbing the lower ridges which hide the summit from the town of Mostar, that everything above 3,000 feet was deep in snow. I persevered as far as I could, but rough limestone, when the strata emerges edgewise, and the interstices are full of snow, is difficult to traverse, and I therefore returned empty-handed after some ten hours of very hard walking and climbing.

The papers were full of reports of phenomenal snowfall in Bosnia, so that a visit to Sarajevo was out of the question, but I tramped some twenty miles up the wild and desolate gorge of the Narenta without seeing an iris on the lower levels, and the snow made it quite impossible to reach the higher levels at which alone irises appear to occur in this district. The rocky gorge through which the Narenta flows between Jablanica and Dreznica is very wild and lonely. Among the rocks there grows everywhere a cytisus which looks like a laburnum with erect, instead of pendant, racemes of yellow flowers. From time to time I encountered flocks of goats and lean sheep browsing on the cytisus and the scanty vegetation and tended by peasant women who were also busy spinning wool into the coarse yarn of which their garments are made.

Another plant which forms a conspicuous feature of this district is a large bright yellow-flowered euphorbia, possibly E. Wulfenii, while on the higher levels I crossed wide stony stretches on which a minute, shrubby species of this same genus formed almost the only vegetation.

Where the valley becomes broader near Jablanica I noticed in meadows the foliage of some large colchicum growing abundantly.

From Mostar I went down to Metkovic near the mouth of the Narenta, and, having to wait a few hours for the steamer to start, proceeded to investigate the town. In the garden of a military store I saw the finest plants of a white variety of I. germanica I have ever seen. The leaves were fully three feet high and over two inches in width, and the plants were obviously an albino form of the somewhat reddish-purple form of I. germanica, which occurs here and there in cemeteries in Mostar and in cultivated areas. One of the peculiar features of Mostar is the number of disused Turkish cemeteries which lie scattered among the houses all over the town. All are grass-grown and neglected while some are smothered with yellow asphodel, and a few contain a plant or two of this form of I. germanica. I coveted a specimen and at last found a clump on a rubbish heap below the old Turkish bridge across the Narenta. As I climbed a railing and dropped down, a Turk rushed out from the bazaar and seemed to be greatly incensed at my having torn up a few iris plants. I could not explain myself in Turkish, and neither German nor Italian seemed to appease him. However, a small coin or two enabled me to beat a retreat with the plants before a crowd had time to collect.

The white form at Metkovic was more easily obtained, by the courtesy of an officer, who at once had a plant dug up for me, and I hope that this may prove to be one more of the numerous albino forms of I. germanica of which I. florentina is the best known.

From Metkovic to Spalato takes nearly a whole day in a small steamer, but there was not sufficient time in any of the small ports at which we touched to find any local irises. In Spalato, I noticed in the public gardens that not I. pallida, but a form of I. germanica is grown. In order to explore the hills that surround the town, I took a train up to Clissa and kept a sharp look-out from the back of the platform of the last carriage as we slowly puffed our way up for any signs of irises. I saw nothing until we had nearly reached Clissa, and then, as we crossed a rocky gully, I thought I saw iris leaves. The last part of the line winds in and out through tunnels, and I considered myself lucky, when, on making my way down, I hit on the right spot, and found the plants I had seen from the train. There were, unfortunately, no signs of flowers, but the foliage seemed to resemble that of I. pallida rather than that of I. germanica.

The southern face of the rock on which the old fort of Clissa stands is smothered with Iris germanica. Plants occur on ledges which are inaccessible without a rope, and it really looks as though the plants were here indigenous. As elsewhere, however, Iris germanica only occurs in the immediate neighbourhood of dwellings, and we must hesitate to say that these plants are certainly indigenous. On the other hand, the fact that I. germanica is almost without doubt a plant of the Mediterranean region and the inaccessibility of some of the ledges on which it occurs makes it possible that these plants are not escaped from cultivation. The colour of the flower is a somewhat reddish purple.

From Clissa I toiled on over the rough, rocky ground all round the top of the amphitheatre of hills which lie above Salona and Spalato, but found no traces of irises except a few plants of the same form of germanica, and these always near cultivated ground.

From Spalato I took an early morning train through the desolate barren hills of inner Dalmatia to Sebenico. It was a blazing hot day when I got down to the sea at that port, and I was rather loth to go up again to the rough hills. However, local information said that I. pumila was to be found at a place called Razina in the neighbourhood of Sebenico. Guide books knew nothing of Razina, nor had I been able to find it in any atlas. However, in Spalato I obtained the equivalent of our Ordnance Survey map and found that Razina was a district lying five or six kilometers to the south of the town. Fortunately, the district lies low and no point is above 200 feet above sea level. This seemed an unlikely place in which to find I. pumila, which I have always looked upon as a plant typical of regions having a cold winter. The ground was very rough ; in places the stones were piled in great heaps and used to form massive walls round vineyards, but there were large patches of apparently virgin soil, mostly covered with a tangled weed of dwarf shrubs. For six hours I scoured the district and found nothing. There were orchids in plenty, including an albino form of O. morio, and muscari was abundant, but no sign of irises could I see. I got tired of climbing heaps of stone and crossing rough tracts of prickly shrub by stepping from one jagged projection of limestone to another, and set out to return to Sebenico, convinced that there was some mistake and I had come on a wild-goose chase. Following a rough track, I noticed over the usual broad stone wall a patch of shrub with more open level spaces than usual. I wondered whether it was worth while to explore this, and almost decided that it was not. It seemed, however, foolish to have come so far and then to hesitate to climb one more wall. Scarcely had I got over it than I saw with surprise two minute tufts of iris leaves about an inch high. Careful search revealed other tufts, and although there were no flowers, several withered perianth tubes and finally three green capsules of seed actually longer than the leaves were enough to show that this must be a form of Iris pumila, but why it grows in such a locality has yet to be explained.

Having collected a few plants, I tramped back to Sebenico, weary but content, and went on by a night steamer to Zara. Behind this town there lies a stretch of undulating stony ground, very similar in character to the Razina district. I had been told that I. pumila was also to be found here, and this time I had the good luck to stumble upon a few plants almost as soon as I reached likely ground, although on continuing my search for some hours, I found no more irises. By this time I had discovered that irises do not like grass, even in the hottest positions. The positions in which they are found are always fairly open, usually facing south or south-west and the soil contains, besides the stones, a fair amount of red loam, which is found everywhere in these limestone districts.

After Zara, my next objective was the Velebit Range, near Carlopago, but the problem of how to get there was not easily solved. I finally went by a small steamer, from which I had to land about 3 a.m. in a small boat, with half a dozen Croatian natives, at Valcassione, which seemed to consist of two huts. From one of these the postman, who was also the boatman, produced two horses for the ramshackle old diligence in which I had to drive across the island to Pago. It was an uncanny landing, and only the postman understood a few words of German and Italian. However, a gendarme armed with a rifle appeared on the scene and drove on the box of the diligence. As I walked with him up a long, rough hill, it was just light enough to see that the stony ground was everywhere covered with white Asphodel ramosus, a tall euphorbia and a green flowered helleborus.

From Pago I went across to Carlopago, on the mainland, and by the kindness of a friend, who had a Croatian guide in waiting, I was able to start off at once up the Velebit Mountains to a small plateau, near the summit of Velnae, where a supposed new species of iris was known to grow. The ground was the roughest that I think I have ever crossed, mere limestone boulders piled one above the other. As we got up to about 3,000 feet, crocus leaves seemed to replace grass in the interstices between the rocks, and on the south-west face, as usual, I found a few small iris plants. This was not, however, the locality for which I was bound ; to reach this it was necessary to climb higher. At last we got over the brow on to a turfy hollow, and I shall never forget the sight of this little valley covered with tufts of Gentiana tergestina, through some of which iris leaves were actually pushing their way. Purple and white crocuses and a yellow flowered primula and muscari were also abundant. Snow still lay in the hollows facing north, and though iris leaves were everywhere apparent, no sign of flowers could I discover. The plants look uncommonly like I. pumila, but some herbarium specimens, which Dr. Degen very kindly sent me from Budapest, showed that the flowers were yellow and that the plants must be some other species than I. pumila—possibly a yellow-flowered form of I. aphylla. Both these species seem equally strange at such an elevation in this locality ; but then a sibirica also occurs on these very rocks, and nowhere else apparently in Europe ! For the determination of this iris we shall have to wait until transplanted specimens flower.

From Carlopago northwards the so-called Iris illyrica is plentiful. By the kindness of a friend in Zengg, who seems to know every inch of the country, I was able to see plants in flower along the sides of the valley at the mouth of which Zengg is situated, and also just coming into flower, but dwarfer, high up on Mount Veljun. Among the plants which I saw in flower, there was considerable colour variation, and I even found specimens with the dark bluish beard, the origin of which in some garden pallidas had always been a puzzle to me. I. illyrica is practically an enlargement of I. Cengialti, and the Zengg plants certainly provided an intermediate step between the latter and the Ragusa pallidas. I. illyrica was first described as coming from the island of Veglia. I therefore set out from Fiume and got across by boat to the island from Cirkvenica. I went right across the island, which consists of rolling, stony ground, in most places covered with scrub. Everywhere grows the usual green-flowered helleborus while the undergrowth was in many places pink with Cyclamen repandum (hederaefolium). Some open, grassy patches were literally purple with Orchis morio, while O. punctata and the huge O. militaris were also common. Of irises I saw no trace, until I reached the centre of the island, and then only found a few flowerless plants among the stones. The foliage, however, leads me to suppose that they are the typical I. illyrica.

From Fiume I also went up to the top of Monte Maggiore and found Iris graminea growing in open beech copses at about 3,000 feet. The plant does not there make the dense clumps that are formed in our gardens, but each tuft of leaves stands apart, and I even found rhizomes which had run straight ahead for a foot or more without branching at all. I had seen the same thing in a very similar position on Mount Veljun.

On my return to Trieste I was taken by Dr. Marchesetti to see the botanic garden which he has formed on the hillside above the town. The space is relatively small, but the limestone which is everywhere abundant has lent itself to the construction of innumerable narrow terraces, in the pockets of which all the local plants find congenial homes. My guide also told me of three localities near Trieste where I. illyrica is to be found growing wild.

On Monte Spaccato I wandered for two or three hours, and, though I found an amazing number of orchis, a poeticus narcissus, the dark pulsatilla-like Anemone montana, and even Solomon's Seal and paeonies in flower, I could find no trace of irises. It seemed as though the efforts of the Austrians towards re-afforestation had been fatal to them. I searched every open space in the wood that now clothes the summit, but in vain ; it was only when I came out of the wood again on to the meadow-like land that I found two flowerless plants.

The next day I was able to get to the other localities, and in both found I. illyrica flowering in quantity. In each case the plants were on almost perpendicular rocks facing south-west, and the plants were certainly smaller than those I had seen at Zengg. Indeed they were very little larger than Iris Cengialti. The stems bore about three or four flowers, and the spathes were of that curious brown-scarious colour with a purple line across the base that we find in the Loppio form of I. Cengialti. It was curious to notice also that in one place all the plants bore flowers of a very rich dark violet colour, while in the other locality each plant differed a little in colour from its neighbour.

As regards the origin of the typical I. pallida, the results of my search are therefore merely negative. I feel convinced that neither the type nor the variety dalmatica occurs wild along the coast between Fiume and Gravosa. On the other hand, the fact that the Trieste plants were slightly bigger than I. Cengialti, those that I saw at Zengg somewhat larger, and those at Ragusa larger still and a closer approach to the typical I. pallida, seems to suggest that the home of the latter must be even further south, possibly in Albania or in Greece.

If I have used the name of illyrica, it is because until seeds have been obtained, it is impossible to say whether the plants are to be considered as a separate species or whether they are to be assigned to I. Cengialti or I. pallida. Of these, the former has greyish, almost spherical seeds, while those of the latter are dark red-brown and compressed.

An Iris Excursion.

THE SOUTH OF FRANCE.

(*" The Gardeners' Chronicle "—June 17th,* 1911.)

One of the most serious drawbacks to the cultivation of many irises is that there is no time in the year when there is not something to see or attend to in the garden. Narcissus, tulip, and even rose enthusiasts can take holidays, and yet not feel they are missing something in their garden, or not doing their best in the matter of cultivating some other treasure. To the iris grower, no such period ever seems to come, and it was with many misgivings that I tore myself away in the last week in April for a week's iris hunting in the south of France.

The morning after my departure found me at Tarascon, after sundry fleeting visions of various forms of Iris germanica in cottage gardens as the train rushed down by the Rhone. Tarascon itself proved, as a French friend warned me would be the case "au dessous de tout," which we might render "beneath contempt" if we were not afraid of further offending the worthy townsfolk, whose self-conceit has suffered so sadly from Daudet's caricature. Once at Tarascon, one can hardly refrain from crossing the suspension bridge to Beaucaire and this proved to be well worth while, for the hill on which stand the ruins of the Chateau of St. Louis is covered by thousands of red-purple and white irises, which proved to be germanica atropurpurea and a white form of germanica. This was exceedingly interesting, for one of the points on which I hoped to find information was precisely the relationship and identity of the several white irises, the nomenclature of these being sadly confusing.

It was an easy matter to compare the white and purple forms in such a spot, and the growth and the shape of the segments proved to be identical, except, perhaps, that the spathes of the side branches were more apt to be two-flowered in the white than in the purple variety. Another difference was that the hairs on the inside of the haft of the standards were much more numerous on the white than on the purple form. In the latter, indeed, they were sometimes almost entirely absent, although in some flowers they would be quite conspicuous on one standard and almost absent from others. The affinity of the two forms seemed almost to be confirmed by the frequent occurrence of purple tinges and even stripes in the pure white of the albino form.

From Tarascon I went to Arles, and found that the white iris in the public gardens there was not this white germanica nor florentina, but albicans, of which more will be said later. From Arles it is but a short excursion to Mont Majour, which provided a good instance of the effect of environment on the growth of irises. At the base of the hill, among the bushes, I found a yellow-flowered form of I. chamaeiris, with a stem rather more than a foot in height, while a hundred feet higher, on the open limestone rocks, the same iris was dwarfed to little more than 3-4 inches in height.

The next morning found me setting out early, by a slow train, across the apex of the Camargue, on the way to Montpellier and Cette. It was interesting to see that nearly every wayside station had long rows of Iris germanica, often of more than one form, in endless slight variations of colour between blue and red-purple. It seems as though this iris is more willing to set seed there than it appears to be in England, and these varying forms may well be seedlings.

My errand at Cette was to spend a few days with a French friend and fellow iris enthusiast who lives in the neighbourhood and has a wonderful garden full of interesting plants, a veritable sun trap and rejoicing in a limestone soil. This means, of course, that the Pogoniris, as a whole, do better than the Apogons ; indeed, there are few other gardens where Oncocyclus species and hybrids succeed so well, or where the same plants of Iris iberica have been grown for 15 years.

My friend is also fortunate in that the huge and rare I. Ricardi flourishes with him, and has given him, when crossed with pollen of various pogoniris, numbers of magnificent hybrids. These are characterised by stout stems, which, even in England, grow to about 4 feet in height. Ricardi itself is near to I. cypriana, and came originally from Jerusalem, though we do not know that it is native there.

The hills in the neighbourhood of Cette are of rough, loose limestone, on some of which Iris chamaeiris can be found, but even apart from irises, they are a veritable joy to botanists, Orchids abound amid the dwarf Cochineal Oak (Quercus coccifera), a creeping shrub, not more than 18 inches high, and looking more like a dwarf holly than an oak. The air is scented with wild rosemary, and lavender and Cistus monspeliensis and C. albidus. The name of the latter was given in reference to the glaucous leaves and appears, at first sight, somewhat misleading applied to a plant with pink-purple flowers, growing side by side with the white-flowered monspeliensis. In some places, the hillsides were white with thousands of large, white asphodels and probably Asphodelus ramosus.

From Cette, a most interesting excursion was to Les Onglouses, which name is said to mean Iris in the local dialect (Ongle being the botanical name for the claws of the segments of an iris). The railway runs within a mile of the Mediterranean, and as the train drew up there were millions of white irises to be seen on all sides, mingled with occasional patches of germanica atropurpurea. The soil is of a deep sand, so loose that straw and reeds from the marshes have to be ploughed in between the vines to prevent it being blown away. The water is not far below the surface, which is drained by cutting deep, narrow lanes between the vineyards. All the banks swarm with the white irises, which even have to be hoed up as weeds among the vines. In local floras, the name is always given as I. florentina, but this is a mistake, for they are all albicans. Indeed, I nowhere saw the true florentina, except in a garden in Hyères, whither it had been imported from Holland.

Iris albicans was first described as a species by Lange, from specimens which he obtained from the neighbourhood of Almeria, but as it is also found in quantities all through Southern France, Italy, Greece, and even far away into Asia, its precise origin has been in doubt. No real proof of the following theory is yet forthcoming, but no one who compares albicans with I. Madonna, will doubt, I think, that we have here the blue and the white forms of the same thing. I. Madonna was first discovered, together with a white-flowered form, by Botta, in 1837, on Mount Saber, in the Yemen, in Arabia, and these specimens exist in the Paris Herbarium. It is not, however, described until 1892 (*cf.* Bull. Soc. Tosc. Ortic. XVII. 1892. 130), and has only recently been introduced into cultivation by an Italian firm, who also obtained the white form. This, however, seems to have been rare, and to have been lost, or, possibly, if the theory is right, transplanted among other plants of albicans already growing in the garden. The attractiveness of the theory lies in the fact that, if Madonna and albicans are the blue and white forms of an Arabian iris, it is only natural that this white iris should be found, as is indeed the case, in Mohammedan cemeteries, from Spain in the west, into Persia and even further east. In no other way can we easily account for its very wide distribution, though there are some equally puzzling questions suggested by the fact that the large form of Iris germanica, which Foster received from Kharput, is also the commonest form at Srinagar, in Kashmir, while the Iris nepalensis of Wallich, the commonest iris in Khatmandu, in Nepal, is simply the form that is commonly grown here as Iris germanica atropurpurea.

Before returning home I went east as far as Hyères, and found Iris spuria, only in bud unfortunately, growing in the stiff clay in the marshes between the town and the sea, but failed to find the I. olbiensis of Henon on the Domaine du Ceinturon. It still existed there some three or four years ago, for I have some plants collected then. Unfortunately, they are all specimens of the dingy yellow forms, and not of the clear yellow or deep purple varieties. However, in spite of their poor colour, they have been enough to know that I. olbiensis is only a form of I. chamaeiris.

Another interest was provided for me on the tramp back to Hyères from the sea by the changing forms of Iris pseudacorus along a wayside stream. There was constant variation—within a few yards even—in the amount and distinctness of the brown veinings on the falls, in the shape of the standards, and even in the colour of the anthers.

A hurried visit to the Paris Herbarium, at the Jardin des Plantes, which is particularly rich in Chinese specimens, was the last incident of an iris excursion which proved to be exceedingly interesting.

The Origin of some Garden Irises.

(" *The Gardeners' Chronicle*"—*July 18th*, 1914.)

About two years ago I was able, by the kindness of the Hon. N. C. Rothschild and of Dr. A. V. Degen, of Budapest, to see a dried specimen ot an iris which had been discovered on the Velebit Range, in Dalmatia. This was recorded in a paper on the local vegetation by Dr. Degen as being related rather to I. chamaeiris, Bert, and to I. lutescens, Lamarck, than to I. variegata, L. The branching stem and the wholly herbaceous spathe showed that it had nothing to do with the French I. chamaeiris or lutescens, while the fact that the outer edges of the spathe-valves were not keeled was sufficient evidence that the iris was not merely a form of the Balkan I. Reichenbachii.

In April, 1913, I went to Dalmatia in search of irises, and by the kindness of the late Herr Dobiasch, of Zengg, in Croatia, was provided with a native guide to take me to the exact spot on the Velebit Range where this iris was known to grow. The mountains rise very abruptly from the sea coast and consist of very rough and almost barren limestone. In former days, when this coast was subject to Venice, tribute appears to have been paid in timber, with the result that the hills were almost entirely denuded of trees, and it is only recently that, further north in the neighbourhood of Fiume, attempts have been made towards re-afforestation on any large scale.

The iris, of which I was in search, grows in a shallow cup-shaped hollow near the summit, at a height of some 4,000 feet. Just before we reached the edge of the cup, and while we were still on the south-western slope facing the Adriatic, I found growing among the limestone rocks a few iris leaves, together with crocuses and muscari. My guide urged that it was hardly worth while to stop to collect any of these plants because we had almost reached our destination, where it was far more abundant. However, I took up a few plants, and then we soon reached the top. In this depression patches of snow were still lying on the north side of rocks, and all around were Gentiana tergestina, a near relative, if not a form, of G. verna, crocuses, of a species as yet undetermined, a yellow-flowered primula and, coming up among them all, the young leaves of an iris, obviously belonging to the bearded section. The soil of the hollow was a layer of black vegetable mould overlying the limestone below.

During the present year the plants which I brought away with me have flowered well. It was interesting to watch them develop as they grew side by side. The foliage of the plants from the south-west face was noticeably glaucous and the entirely scarious spathes pointed to I. pallida. When the flowers opened it was obvious that here was one more of the long series of plants which in the north, near Roveredo, are called I. Cengialti and in the south I. illyrica.

The plants from the hollow at the top had much greener foliage and were evidently of two kinds, for the spathes were in one case wholly green and in the other scarious in the upper part and green at the base. In both cases the stems branched and the slightly-ribbed foliage of the plants with wholly green spathes led me to conclude that Dr. Degen's iris must be a form of I. variegata, L., which is common in many parts of Hungary. This was what they eventually proved to be. The standards are of a clear, pale yellow and the red-purple veining on the falls is not heavy, and I have no doubt that the veins had wholly disappeared in the drying of the original herbarium specimens. The behaviour of iris flowers as they dry is very erratic. Some keep their colours to an astonishing degree, while others, the yellows especially, rapidly lose all traces of their original hue and become merely a light brown.

It was sufficiently surprising to find I. pallida and I. variegata growing together, but a still greater surprise was the third variety of iris, which had partly scarious and partly green spathes. The four-flowered inflorescence was that of a small I. germanica, and only the slightly brownish tinge of purple in the buds showed that there was any difference. When the flowers eventually unfolded they were at once interesting and disappointing. They were interesting from the fact that they were evidence that the so-called squalens and sambucina are, as I had long supposed, hybrids of I. pallida and I. variegata, and disappointing because they proved to be only an iris which we have long had in our gardens, but which is no great ornament to them.

In the standards the yellow and the purple of the two parents fight for the mastery, and produce that dingy shade of dull purple which fully justifies the name of squalens. The falls are of a pale reddish-purple with thick darker veins, which allow the whitish ground to show between them only near the end of the beard. This is composed of whitish hairs tipped with yellow, and the flower is, in fact, a typical I. squalens.

All the plants I have described are naturally small, growing as they do in poor soil at a considerable elevation, but I have no doubt that they will develop under better conditions to more than the 15 or 18 inches to which they have attained in this dry year in poor, stony soil.

The discovery of these three plants, the squalens hybrid and its two parents, pallida and variegata, growing together in a locality which certainly was never inhabited, and where they could scarcely have been planted by the hand of man, goes far to explain the origin of many of our garden bearded irises. I have a whole series of hybrid forms, coming chiefly from the neighbourhood of Bozen and Riva, in the Southern Tyrol, in some of which the yellow of variegata predominates, while in others the purple of the pallida is more apparent. Judging from the localities from which they come, I never felt confident that they might be described as natural hybrids between I. pallida and I variegata, but after my experience in Dalmatia I am inclined to think that it is extremely probable that they are really wild plants.

Typical I. variegata, such as we know it from Hungary and the Balkans, is not now known to grow at Bozen, but, at any rate, there grows near that place a plant which closely resembles I. variegata, though certain characteristics and the fact that it does not readily set seeds incline me to think that it is a hybrid and not merely a form of that species. In the same neighbourhood forms of I. pallida are also abundant, and I have now little doubt that the original parents of the many so-called "German" irises of our gardens are to be sought among these plants.

Whether the problem of the origin of Iris germanica itself will ever be solved is doubtful, but I am almost inclined to suggest that it may be of hybrid origin. This would explain many of the difficulties—its almost complete sterility, the frequent malformation of the flowers, and the fact that it has never been found wild. The chief difficulty that is not explained lies in I. germanica's habit of beginning to grow in autumn instead of waiting for spring. If it were not for this there would seem to be no reason why I. germanica should not have resulted from a cross between I. aphylla and I. pallida. The flowers of the latter especially are so variable in their shades of colour that the many varying colour forms of I. germanica could easily be produced and the wholly herbaceous, often purple-flushed spathes of I. aphylla would combine with the wholly scarious spathes of I. pallida to give us the partly scarious and partly herbaceous, often purple-flushed spathes of I. germanica.

These suggestions are only put forward tentatively, but it would be interesting to know whether any seedlings have already been obtained by crossing I. aphylla and I. pallida, or any other tall, bearded irises. I have made the cross recently and hope to obtain seeds which may throw more light on the vexed question of the origin of our garden bearded irises.

Hybridisation in the Iris.

(*Translated from the French—Revue Horticole*—1923.)

It is now many years since I undertook the revision of the genus Iris, as much from the botanical as from the horticultural point of view. At first I tried to raise from seed all the botanical species, then I made crosses between them in order to prove the truth or falseness of the ideas which I had formed on the parentage of the species. It is with the results of these crosses that I am going to deal in this paper.

First let us review the large divisions which Nature has constituted in the genus. There are the bulbous and the rhizomatous species. Hybrids do not occur between plants of these two sections, although numerous experiments have been made with a view to producing them. An attempt has been made to combine a bulbous with a rhizomatous species, both of which grow in the Iberian Peninsula, *viz.*, I. xiphium and I. spuria, but so far without success. Yet there is a striking resemblance between the flowers of these two species and it should be noted that they grow in the same districts, in Spain and even in France, for I. xiphium still grows round about Béziers and I. spuria is found near the mouth of the Hérault.

The rhizomatous species are divided into Pogoniris (bearded species), Apogon and Evansia (crested species). No one has succeeded in producing hybrids between Pogoniris and Apogon. I remember asking the late Sir Michael Foster if he had succeeded in producing crosses between these two sections of the genus. He replied that he had tried to fertilise an I. germanica with the pollen of an I. spuria. From a few seeds which he believed he had obtained from this cross he had raised a single plant which he showed me. From the leaves it was an I. germanica, and what intrigued Foster was that the plant had never flowered. Consequently he was led to believe that it was a hybrid. " Otherwise," he told me, " this plant ought to have flowered, for all the Pogoniris flower in this garden." It is not known what became of this plant after Foster's death. It has never revealed its secret.

There exists at least one hybrid between the bearded and the crested irises. Before I made the experiment Foster and M. Denis had already done so without success. I did not expect to succeed myself, but one day I had the idea of putting a little Iris tectorum pollen on the stigmatic surface of I. Cengialti *var.* Loppio. From this cross I obtained two seeds which gave me two plants. What is more remarkable is that the pollen of I. tectorum gave to the hybrid (Lop-tec) the flattened shape of this species, while the female parent gave to the offspring its scarious spathes and the hairs of its beard, placed at the summit of a rudimentary crest. Unfortunately this hybrid is quite sterile, for I have made repeated attempts to fertilise it with its own pollen and with that of its parents.

In the bearded species there are at least three large sections : Pogoniris, Regelia and Oncocyclus. There is very little difficulty in making crosses between them. Regelia and Oncocyclus have given us, thanks to Sir Michael Foster and to M. Hoog, of the firm of C. G. van Tubergen, Haarlem, the Regeliocyclus hybrids, in which the large flowers and coloration of Oncocyclus are found united with the floriferous character of Regelia. It is also to Foster that we owe I. ibpall (iberica *x* pallida), I. ibvar (iberica *x* variegata), I. parpall (paradoxa *x* pallida), I. parvar (paradoxa *x* variegata), I. lupceng (lupina (Sari) *x* Cengialti), etc. In all these cases the hybrids are more or less midway between the two parents. They are more easily successful than Oncocyclus but they must, however, be given more care than Pogoniris. They must be transplanted at least every three years and given a calcareous soil.

These hybrids are all sterile except in very rare cases; apparently they have never seeded in England, but a few years ago M. Denis sent me, from Balaruc, some seeds coming from an I. Pogoniris *x* Oncocyclus. From them I raised a single plant which is very remarkable. It is a dark-purple "germanica" with the brown-purple spot of an Oncocyclus. This plant grows as easily as a Pogoniris and flowers profusely.

Nor is it difficult to make crosses between Regelia and Pogoniris. The yellow and purple of I. chamaeiris may be combined with the well-marked veins and almost black beard of I. Korolkowi. The same may be done with I. stolonifera, but all the hybrids of this species which I have so far seen are ugly. There is always a mixture of colours producing a very disagreeable effect.

As for the bearded Irises of our gardens, they are, for the most part, hybrids. The true I. pumila is as rare in cultivation as the name is common in catalogues. In the wild state, in Austria, Hungary and South Russia, there are numerous varieties of different colours. Nevertheless, I. pumila coerulea must be a garden variety as it hardly ever seeds and the flowers are not formed in precisely the same fashion as those of the wild plants. It is well known that in I. pumila there is no stem, while the tube above the ovary is relatively long. In Iris chamaeiris the stem is at least as long as the tube and usually much exceeds it. Now I have succeeded in combining these two species in a sterile hybrid.

In my opinion, the commonest iris of all, I. germanica, is nothing but a hybrid. It seeds with difficulty and the few plants which have been raised from its seeds are all dwarfs, very similar to I. aphylla. This species, widespread in central Europe, is remarkable in that its stem divides below the middle and even at soil-level, and this character is also found in the sowings of I. germanica. Moreover, all the Central European species: aphylla, variegata, pallida, sibirica, pumila, lose their leaves in autumn and do not sprout again until spring. I. germanica, on the contrary, starts growth from the time of the autumn rains and it often happens that the clumps do not flower because the buds are frozen before emerging from the leaves, a thing which never happens with the Central European irises. The majority of the bearded irises of our gardens come, not from Iris germanica, but from the cross of Iris variegata with Iris pallida. The two species grow together in the wild state round Botzen, in the Tyrol, and also on the Velebit Mountains in Dalmatia. In both cases are found, among plants of the two species, hybrids of a smoke-colour, *i.e.*, squalens, sambucina, etc. This coloration results from the conflict between the violet of pallida and the yellow of variegata. The amoena irises are only variegata irises with a white ground instead of a yellow one, like leucographa, which has been found wild in Hungary.

This is, to my mind, the origin of the old varieties. I. trojana and other species with a tall stem, of oriental or rather Levantine origin, were already employed some years ago for hybridisation. Thus, M. Denis used I. Ricardi (=mesopotamica) to produce his fine hybrids, while Isoline is evidently the result of a cross of I. trojana.

All the yellow tints come from I. variegata—except some dwarf precocious-flowering plants which are hybrids of I. chamaeiris. I. lutescens is only a variety of this last species, while I. flavescens approaches I. variegata. I. flavescens has been long confused with I. imbricata, from the Caucasus, quite a different plant which has not yet given any hybrids.

If we examine closely the spathes of the garden varieties we find that they are entirely herbaceous at the time of flowering in I. variegata, I. aphylla and I. trojana, entirely scarious in I. pallida, and half herbaceous, half scarious in I. germanica and the majority of the well-known varieties. Here is yet another proof of the hybrid origin of I. germanica.

Among the I. Apogon there are numerous groups of plants more or less closely allied and, within these groups, it is not difficult to produce hybrids. Thus, I. sibirica which is, strictly speaking, a European species, may be combined with its Asiatic relative, I. orientalis (Thunberg). From the former comes the tall stem raising itself well above the leaves, while the latter gives large flowers with the lower segments well spread. These two species have albino forms and consequently to obtain sky-blue flowers one has only to combine the dark-blue of the wild plant and the white of an albino. Some of these hybrids are fertile and give good seed abundantly, but there are some sterile ones.

It is now about ten or twelve years since two irises of the sibirica group, with yellow flowers—I. Wilsoni and I. Forrestii—were introduced from China. The former is easily combined with I. sibirica and from the cross is obtained a blue I. sibirica with a yellow ground, entirely sterile. I. chrysographes is a beautiful Chinese species with dark violet flowers, spotted with gold ; sometimes there is only a single line of gold in the centre of the lower segments. The combination of I. chrysographes and I. Forrestii gives us two almost identical hybrids in which the yellow spots are much larger and more numerous. The remarkable thing is that the hybrids between these Chinese species are fertile. They seed easily and give a whole series of different and interesting forms.

Moreover, I. chrysographes and I. Clarkei may be combined with the Californian species, such as I. Douglasiana and I. tenax. These hybrids are very beautiful and floriferous, but they remain sterile. I have also combined I. Wilsonii and I. tenax. This hybrid is extraordinarily floriferous, but sterile. The flowers are rather ugly, dark-blue dotted with pale yellow.

Flowers with this coloration are also found among the hybrids between I. pseudacorus and the neighbouring American species I. versicolor, and between I. spuria and I. ochroleuca. It was Foster who made hybrids between the last-named and who has given us I. Monspur. I. Monnieri is only a garden variety of I. ochroleuca or perhaps a hybrid between this species and I. aurea, from Kashmir.

The Hexagona group contains only three species : I. hexagona, I. foliosa and I. fulva. I. foliosa is a dwarf form with the large flowers of hexagona, and one day I had the idea of attempting to give it the tall stem and the terra-cotta colour of I. fulva. The cross succeeded and I. fulvala is a beautiful, vigorous hybrid with dark-purple flowers, even giving seeds. From these seeds I have raised varieties with more or less chamois-coloured flowers—an unexpected result.

As for the Japanese Irises, I do not believe that there is anything in them other than I. Kaempferi. I. laevigata is quite a distinct species. The leaves of the former have a raised nervation, well marked in the centre, while those of the latter are smooth. The seeds of I. laevigata are almost identical with those of I. pseudacorus, with a shining epidermis ; those of Kaempferi have an irregular and flattened shape. By what means have the Japanese succeeded in modifying the wild plant, obtaining varieties with double flowers, spotted and variegated with all colours ? It is not yet known, but they have done the same with the chrysanthemum and with the cherry and plum-trees which ornament their gardens in spring. The same applies to I. laevigata ; they have obtained varieties with white flowers spotted with purple (I. albopurpurea) and others with double flowers of the same colours.

The bulbous species lend themselves easily to hybridisation, although the resulting plants are generally sterile. Let us begin with Xiphion. The true I. xiphium is easily distinguished from all its allies by its short funnel-shaped tube.

All the others have a linear tube, *e.g.*, I. tingitana, I. filifolia, I. juncea, etc. In combining these species with I. xiphium the length of the tube is reduced by half, and we shall find examples of this shortened tube in some of the so-called Dutch varieties. These few varieties are hybrids (tingitana *x* xiphium), while the majority of them which have only the short funnel-shaped tube are garden varieties of I. xiphium praecox. The last-named is a precocious-flowering variety with large flowers, coming from Southern Spain.

I. Boissieri is a bearded species, the beard being composed of long yellow hairs. It is possible to shorten by half the length of these hairs by making hybrids with I. xiphium or with I. tingitana, both non-bearded.

Among the irises of the section Juno there are species with spherical seeds, others with cubiform seeds and still others whose seeds are distinguished by a white caruncle. Between the members of these three classes there are no hybrids, while the members of the first two classes cross fairly easily among themselves. I. persica and I. sindjarensis belong to the first class and we have I. sindpers, etc. I. bucharica, I. orchioides and I. warleyensis have cubiform seeds and plants with large yellow flowers may be obtained by combining I. bucharica and I. orchioides. The bucharica *x* warleyensis hybrids have yellow or greenish flowers bordered with green or brown. Of the third group, we cultivate only I. Rosenbachiana, with yellow pollen, and probably another closely-allied species of which the pollen is white. These two species give hybrids easily.

In the Reticulata section there are not many hybrids. It is well-known that Iris reticulata has quadrangular leaves, while those of Iris Bakeriana are almost cylindrical, with eight parallel nerves. In combining these two species, hybrids of extraordinary beauty are obtained, the colours being very bright and the leaves having six nerves.

We have just reviewed the hybrids which have been obtained in the genus Iris. What conclusions may be drawn from these experiments? Here are some :—

(1) The large sections of the genus: Apogon, Pogoniris, Juno, Xiphion, etc., do not cross with each other. (Hybrids may be made, however, between Pogoniris and Evansia).

(2) All the species of section Pogoniris will combine with each other. I have even succeeded in fertilising I. trojana with the pollen of Iris chamaeiris.

(3) Hybrids produced by two closely-allied parents are often fertile; *e.g.*, the hybrids between the Chinese members of the sibirica group and Iris fulvala.

(4) Hybrids produced by a cross of two species far apart in the classification of the genus are always sterile.

(5) When hybrids between two quite distinct species are obtained, their characteristics are more or less midway between these two parents. There is no Mendelian dominance. Unfortunately, successive generations cannot be raised, for these hybrids remain sterile.

Curious result of Hybridisation.

(“ *The Gardeners' Chronicle* ”—*November* 13*th*, 1915.)

For three years now I have had Iris unguicularis, or, as it is more commonly but less properly called, stylosa, in flower in the last week of September. The plants which give me these very welcome flowers are a few that resulted from crossing the typical Algerian plant with a dwarf Greek form. The interest of the cross lies in the fact that the Greek plant has never in my garden flowered until March or April.

It would be interesting to know whether any work has been done with a view to discovering the factors that determine the date at which a plant flowers. Such evidence as I have so far accumulated scarcely seems to throw any light on the question. For instance, a stray flower of Iris chamaeiris fertilised in June with pollen of Iris trojana, produced a hybrid, which is intermediate in size between its two parents and which has flowered regularly for six or eight years past in September and October. Strange to relate, however, this hybrid has refused to flower in the autumn in the south of France in a soil in which bearded irises are far more vigorous than they are here in this light sand. On the other hand, a cross between I. chamaeiris and the so-called I. florentina, which a neighbour raised in a garden not half a mile away, frequently gives him many spikes of white flowers in the late autumn. while in this garden it always refuses to flower except in the spring.

Self-fertilisation in Irises.

(" *The Gardeners' Chronicle*"—*December 4th,* 1909.)

It is usually supposed that irises are a good example of Nature's provision that self-fertilisation should be impossible, and it is a plausible theory that the co-operation of insects is necessary in this genus. Having regard to the position of the stigma relatively to that of the anthers, it does seem at first sight as though fertilisation would be impossible without the intervention of insects. The latter are said to collect pollen on their backs as they brush against the anthers in their endeavours to reach the nectaries at the base of the flowers, and then to deposit the grains on the stigma of the next flower they visit. Knuth (Handbuch der Blutenbiologie, vol. ii., Part II.) has even gone so far as to draw up lists of the various insects that have been observed to visit each species.

Some irises are undoubtedly fertilised by this means, but anyone who visits a garden containing a number of species of iris cannot fail to be struck by the number of capsules of seed on such species as pseudacorus, sibirica, versicolor, Hookeri (or setosa), graminea, ochroleuca, spuria, etc. Nearly every flower seems to produce a capsule, while the larger, bearded irises set seed only comparatively rarely, unless artificially fertilised. A little observation reveals two facts: first, that the ripe pollen of all the species mentioned is very easily dispersed from the anthers by the slightest movement, and, second, that the stigma is in every case a triangular tongue, which projects downwards. The motion of the plants in the wind precipitates the pollen on to the hafts of the falls, which are touched from time to time by the pendulous stigma, and self-fertilisation is thus effected. The shape of the pollen grains of these Apogon Irises is entirely different from that of the bearded groups, and herein, apparently, lies the explanation of the phenomenon.

Irises from Seed.

(" *The Garden* "—*September 21st*, 1918.)

It is astonishing that so few gardeners think it worth while to raise irises from seed. The process is supposed to be much more intricate and lengthy than it really is, and yet, surely, even if seeds sown now will not give flowers before 1920, the interest and pleasure that the flowers afford us when they do unfold is of a different quality from that which we derive from bulbs or roots ordered by the dozen from a catalogue. Some plants, indeed, such as the beautiful Californian Irises, tenax, Douglasiana, Watsoniana and bracteata, can only be satisfactorily grown from seeds; others, such as all the members of the sibirica group, are much more vigorous and floriferous when planted out as seedlings and left undisturbed. All species seem to vary within certain limits when raised from seed, and it is pleasing to be able to select one's own favourites, and then increase the stock of them by division of the plants.

All seeds should be sown within the next month or six weeks, for, if it is delayed until the new year, their vitality seems to be much impaired. It is a curious fact that seeds of bulbous plants, which are not sown by about the time at which the bulbs begin to grow again in the autumn, often refuse to germinate at all, whereas, when they are sown early, they germinate with great freedom and regularity. The seeds should be sown in pots of rich, light soil, and covered about half an inch deep. The pots should then be sunk to the rim in the open ground, and by preference protected from birds by a covering of wire netting. There the pots should remain exposed to the weather, and in the new year it will not be long before the tips of the seedlings begin to break through the ground. Then, especially in severe weather, the protection of a sunny, airy cold frame is an advantage, though I have raised thousands of seedlings without even this protection.

When rhizomatous irises have made four or six leaves, by May or June, they should be planted out in their flowering positions, and growth should be encouraged by a light top-dressing and by stirring the surface frequently. The majority should then flower in the following spring. Bulbous plants, however, should be allowed to dry off under glass or in the open and be kept dry, if possible, until the autumn, when the pots may be plunged again in the open. At the end of their second summer, the little bulbs should be sifted out of the pots, and be planted in beds in the open. They should begin to flower two years later.

On raising Irises from Seed.

(" *The Garden*"—*November 22nd*, 1924.)

It is always astonishing to find that comparatively few gardeners take the trouble to raise perennials from seed. It is quite true that in most cases garden varieties will not breed true and that all the seedlings from one pod of seed are usually slightly different from each other, but, on the other hand, there is no better way of obtaining a large number of healthy plants, for home-raised seedlings are often far more vigorous than stock which is raised by the division of purchased plants. Besides, there is always the chance of obtaining some striking new variety.

There is no mystery about raising irises from seed, nor is it a very lengthy process. In fact, it is not impossible even now to sow seeds of Iris pumila, which will germinate early in the spring. If the young plants are carefully grown on and planted out as soon as possible, some of them may even flower next autumn, while all should flower in the following spring.

The chief difficulty will probably be to obtain the seeds. Few nursery firms offer iris seeds in their lists, and those lists which do contain them do not usually appear until the new year. Now, if iris seeds are not sown until the new year, they will often lie dormant for a year before they germinate. Even if they are sown as soon as they are ripe, some hybrid seeds will lie unchanged in the soil for ten or fifteen years, and then germinate, but, as a general rule, seeds of species and of the common bearded hybrids which are sown in October or November will germinate readily in the spring.

Seeds should, therefore, be obtained in the autumn from a nursery or from a friend's garden and be sown with as little delay as possible.

Very little that is accurate seems to be known as to the conditions under which seeds germinate most readily. My own belief and experience is that germination is much more certain in an open porous soil than in the close, finely-sifted soil in which it seems to be the custom for gardeners to sow seeds. Possibly this finely-sifted soil may be necessary in cases where the seeds are extremely minute, but, unless the seeds germinate quickly, it is extremely difficult to keep pots of this finely-sifted soil free from moss, which, if allowed to remain, must tend to choke the tiny seedlings.

Iris seeds are by no means minute and, if the soil is passed through a quarter-inch sieve, it will be quite fine enough. The actual soil which is chosen will depend on the section of the Iris genus to which the seeds belong. In all cases the basis may be well rotted leaf-soil. If the seeds are those of bulbous species (xiphium, reticulata and Juno sections) or of the bearded irises, then leaf-soil and sifted mortar rubble may be mixed together in equal proportions. If, on the other hand, the seeds are those of the Californian species or of I. sibirica and of its relatives, then sand or sandy soil should be substituted for the mortar rubble.

The pots should be carefully drained, and I have for years used circles of wire gauze instead of pieces of broken flower-pots with which to cover the hole at the bottom of the pot. Over the wire gauze is placed a little moss, and I find that this drainage remains good for several years. No worms can get into the pots through the wire gauze, and this is certainly no small advantage, for worms in a seed pot are apt either to throw the seeds out on to the surface of the soil or to drag them down too far beneath it.

When the drainage has been provided, the pots are filled with the prepared soil to within rather less than an inch of the top. There is no need to ram the soil down hard. One push with the fingers and a shake of the pot settles the soil in position, and the seeds may then be sown and covered with about half an inch of the prepared soil. Then the pots are well watered in order to soak the soil thoroughly.

The next step is to plunge the pots to the rim in the open, either in sand or in ashes. In sandy soil they can just be sunk in the ground, but when the soil is clay it is better to make up a special plunging bed of ashes and to put the seed pots into this. It is a great mistake to coddle iris seeds, and they should never be placed in a frame in the autumn. The stagnant air seems to have a bad effect on the seeds, of which a large number rot without germinating, while those which are fully exposed to the action of the weather germinate much more readily. More than once I have amused myself after a fall of snow by rolling huge snowballs across the lawn and then on to my seed pots, until I have been able to pile the snow up four or five feet high. Such a heap usually takes a week or two to melt completely away, and when it is melted a sharp look-out should be kept for the tips of the young seedling leaves.

As soon as the tips of these appear, the pots in which germination has begun should be placed under glass, either in a frame or in a cold-house. The object of this treatment is to take advantage of the slight increase in temperature which is found under glass and which will assist the young plants to grow rapidly.

The object of making them grow rapidly is to ensure that the young plants should be big enough to be planted out in their permanent positions if possible before the end of May and in any case early in June. This applies, of course, only to the rhizomatous species, for if the seeds of the bulbous irises are not sown too thickly, the young bulbs may be left to complete a second season in the pots in which the seeds were sown. As soon as a plant has made four or five leaves, of which the longest are about four or five inches long, it is ready to be planted out in the position where it is to flower. The holes for the plants should, of course, be made with a hand-fork or trowel, and never with a dibber, and if the soil is very dry it may be necessary to fill each hole with water before inserting the plant. The surface will then be left loose and dry, thus acting as a mulch and the water used will be available for the roots of the plants and will not be so rapidly drawn out of the earth by the sun as is the case when it is poured on the surface after the plants are in position.

Seedlings of bulbous species should remain in an airy cold frame in their first season until the leaves turn yellow and die down. Then the lights should be left on the frame until September or October, so that the soil in the pots becomes quite dry and warm. In the autumn the old leaves may be cleaned off, taking care not to pull out the young bulbs with them, and a top-dressing of fresh soil of the same composition as that in which the seeds were sown may then be applied with advantage. The frame should now remain open until the young leaves appear and the lights need only be put on to protect them against bad weather. At the end of the second season the bulbs should be lifted out of the pots and planted in their permanent positions early in the autumn. Two years later the first flowers should appear.

All seed pots must be weeded occasionally, and for this purpose the fine sharp point of a knife is as good as anything. With this it is often possible to cut through the root or roots of the weed, which is just pulled up as far as it will come without tearing up the soil or disturbing the seeds or young seedlings.

Iris acutikor.

(IRIS ACUTILOBA AND I. KOROLKOWI.)

(" *The Gardeners' Chronicle*"—*July 2nd*, 1921.)

It is a good many years ago now since through the kindness of the authorities of the Tiflis Botanic Gardens, I received some rhizomes of the Caucasian Oncocyclus species, Iris acutiloba. In the following year some of the plants flowered, and, knowing that I should probably not succeed in keeping them alive, I fertilised them with pollen of I. Korolkowi. I obtained some seeds, which germinated with the usual irregularity and uncertainty of these hybrids. The plants thus obtained showed clearly the influence of their parents, and some at least of them, those that have survived, are both sturdier and more floriferous than either of the species from which they are derived.

The foliage is narrow, stiff and upright, except for the outer leaves in each tuft, which are inclined to be falcate. The stems overtop the leaves and are about nine inches or a foot in height, and bear either one or two flowers. The long, narrow spathes are entirely herbaceous, green in the lower part and slightly flushed with purple near the top.

The flowers have the poise of I. acutiloba, with the pointed outstretched outer segments or falls of that species. The falls are conspicuously veined with deep brownish-purple on a creamy-white ground. The dark signal patch of the Oncocyclus species is very obvious, and is formed by the coalescence of the veins. On the style branches the purplish veining almost wholly obscures the lighter ground, while the broad, pointed beard is composed of scattered dark, black-purple hairs. On the standards the colour scheme is the same as on the falls, except that slight purplish shading partially obscures the cream-coloured ground between the veins, with the result that the standards look distinctly darker than the falls.

There is something peculiarly pleasing about the neat, clear-cut flowers with their conspicuous veining, and they always seem to attract attention when they are growing among the rest of my Regelia Irises. They are easy to cultivate, provided that the rhizomes are lifted in July and stored in dry quarters until October, when they should be replanted in well-drained, rich soil.

In another hybrid from the same cross, the veining is of a blue-purple colour, and both the standards and falls are rounder at the apex, as they are in some forms of I. Korolkowi.

The falls tend to reflex instead of extending horizontally, and the signal patch is much broader, while the broad standards are held erect and do not curve in to meet one another.

Iris albo-purpurea.

(" *The Gardeners' Chronicle* "—*November 20th*, 1909.)

It does not seem to be generally known that the wild type of this species is one of the finest irises of real blue colour. The plant, originally described by Mr. Baker and figured in " *The Botanical Magazine* " (*t.* 7511) as having white flowers delicately mottled or dotted with blue, always looked to me like a hybrid when I saw it growing in the tank that used to stand at the end of the herbaceous ground at Kew. After several attempts, I have at last succeeded in obtaining plants from Japan, which blossomed this summer, and produced splendid flowers of a deep blue colour, with a small yellow signal patch at the bend of the falls. In the structure of the flower-spike and in the yellowish-green leaves, which have not the distinct midrib of I. laevigata and which do not clasp the base of the stem, the plants agree closely with Mr. Baker's description, and this was also the case with some double monstrosities either of a grey-blue or of a deep indigo-blue colour. This last is the albo-purpurea coerulea of the Japanese nursery firms. The method by which these double forms are obtained still remains a mystery, and at the same time it is almost incredible that the artistic sense of the Japanese can tolerate these shapeless varieties, when the wild type has beauty of form as well as richness of colour.

It is unfortunate that Mr. Baker gave a colour name to this species, but it is undesirable to multiply synonyms, and it seems best, therefore, to follow the Japanese authorities in keeping I. albo-purpurea as the name of this species and in making the Kew plant I. *var.* albo-purpurea Baker. As to the further point of the identity of the albo-purpurea with the laevigata of Fischer and Meyer, I shall hope to have more to say next year, if some plants of the latter which have just reached me from Russia are kind enough to flower.

Iris albo-purpurea Colchesterense.

(" *The Garden*"—*July 2nd*, 1910.)

The varietal name here given distinguishes a very beautiful and highly ornamental plant from the species described some years ago in " *The Botanical Magazine*," the present plant having been received from a distinct source under the specific name. In many ways the plant is a great beauty, indeed, well-nigh unique, and for water-side gardening or those moister spots in the garden in which so many plants delight will be found a great gain. The long, ovate falls are of deep violet-blue, with white base, and irregularly bordered white.

The long, erect and narrow standards are bluish-white and slightly waved at the margin. It is a plant of distinction and great merit, of which any description would prove inadequate.

Iris Aphrodite.

(LORTETI X GATESII.)

(" *The Gardeners' Chronicle*"—*July 8th*, 1916.)

Last autumn I received from Mr. C. G. Van Tubergen, junr., of Haarlem, a rhizome of this Iris, which resulted from a cross between I. Lorteti and I. Gatesii. The growth of the leaves is weak, and resembles rather that of Iris iberica than that of either of the parents. The solitary flower has recently opened, and is truly extraordinary. The stem is about a foot in height and, as usual in the Oncocyclus section, bears only the one flower. The narrow spathe is nearly four inches long, and remains green, except at the tip, even when the flower has expanded.

The orbicular standards are white, three and a half inches in diameter, very faintly veined and minutely dotted, especially in the central portion, with violet-purple. For twenty-four hours after the flower first opened the falls remained extended horizontally and deeply concave, as in Iris iberica, and indeed it appeared at first as if this latter iris must have been one of the parents. Then, however, the falls began to droop and became conspicuously convex, the outer edges bending back so far as actually to meet behind. The colour is a faint creamy-yellow, closely dotted all over with violet-purple, and, when expanded, the blade measures three inches across.

The most striking feature is perhaps the pear-shaped patch of rich velvety crimson-purple in the centre of the fall, above which there is a broad straggling beard of pale, straw-coloured purple-tipped hairs. The style branches are coloured and dotted in the same way as the falls, and bear the widely-separated, triangular crests which are characteristic of the Oncocyclus Irises.

I do not know for how many years this beautiful hybrid has flourished in Haarlem. We can only hope that it will prove to have a more robust constitution than either of its parents appears to have, at any rate in this sandy soil. Each succeeding year's experience of the behaviour of bearded irises here and elsewhere makes it more and more clear that there are no exceptions to the rule that, given a sunny and well-drained position, all bearded irises are more vigorous in a heavy soil rich in lime than in any other conditions. Here, in a garden of light sandy soil, they can only be kept in health and vigour by frequent removal into fresh soil which has been manured and enriched for previous crops of another kind.

Longipetala Group.

Iris arizonica.

(" *The Gardeners' Chronicle*"—*February 3rd,* 1917.)

On the western side of the North American continent there occurs a group of irises, of which the best known is perhaps I. longipetala, and of which the members must present considerable difficulties to systematic botanists, who deal only with dried material.

The true I. longipetala is a strong, sturdy plant, confined in the wild state, I believe, to the coast of California, from San Francisco southwards to Monterey. Even in cultivation here it still shows the effect of the Californian climate by losing its leaves at the end of the summer and starting into growth again in early autumn, a habit which clearly indicates that its home is in a region where no hard winters occur.

Further inland there occurs another species, which I believe to be the true I. missouriensis of Nuttall, and which is to all intents and purposes merely an upland or mountain form of I. longipetala. When in flower, it agrees in almost all respects with that species, even to having the characteristically blunt, square-topped standards with a wide emargination or indentation in the centre, and only differs in being more slender in all its dimensions, and especially in its habit of not starting again into growth until the spring when once the leaves have died down in late summer. This is a characteristic which we should expect to find in a plant from mountainous districts with hard frost in winter.

A third and nearly allied species grows in close proximity to I. missouriensis, and, unfortunately, the nomenclature of these two species has become very confused. The name of tolmeiana has been applied at times to both species, and it seems, therefore, better to retain Nuttall's manuscript name of montana for this third species. In its habit of growth it closely resembles missouriensis, but differs in having pointed and not blunt standards, and in producing usually only two flowers on short pedicels in contrast to longipetala and missouriensis, which may each have as many as five flowers in a head on pedicels of varying lengths up to several inches.

All the characteristics which I have mentioned, including even the indentation in the standards of longipetala and missouriensis, have proved to be constant here in successive generations of seedlings, but it can easily be realised that, in cases where the standards of the flowers are either invisible or damaged it is extremely difficult to separate herbarium specimens with any degree of certainty.

A further difficulty arose when in 1902 a description was published in "*Coulter's Botanical Gazette*," xxxiii., *p*. 68, of an Iris pelogonus from Wyoming. It is said to resemble "missouriensis," but to be much smaller, though proportionately stouter. From the fact, however, that it has only one or two flowers on each stem, and that the spathes often reach half-way up the falls, it seems more probable that it is more closely allied to, if not a mere form of, the plant which I take to be montana and not missouriensis.

In 1911 I was looking through a number of herbarium specimens of this group of irises, and to one puzzling example from an altitude of eight thousand feet in Barfoot Park among the Chiricahua Mountains of Arizona there was attached a large packet of seeds. These had been in a museum for several years, but I could not resist the temptation of sowing half-a-dozen in the hope that they might yet germinate, and that the resultant plants might help to settle the difficulty that I felt in determining the identity of the specimen.

However, the result has been rather to increase than to decrease the difficulties presented by this puzzling group of plants, for this Arizona iris has proved after several years' cultivation in my garden to be quite distinct from either of the three or four species mentioned above.

The foliage, which grows to a height of two feet or a little more, with a maximum breadth of about three-quarters of an inch, is very dense, denser even than that of I. longipetala, and of a duller, yellower green, without the glaucous, grey tinge of the other species. Another point of difference becomes very obvious as summer passes into autumn, for the leaves of I. arizonica remain fresh and green long after those of the allied species have withered away. It is not, in fact, until late October or November that the leaves assume a pale, sickly, yellow colour, and begin to collapse. It is curious that in this respect I. arizonica behaves exactly as do the various forms of the Asiatic I. ensata. Among Apogon Irises similarity of the seeds is always a sign of affinity in other respects among the plants, and the seeds of I. ensata are practically indistinguishable from those of the members of the longipetala group. In December it is hard to distinguish plants of I. arizonica from plants of I. ensata, though neither of these could be confused with I. longipetala or its other relatives.

The flower-stems of I. arizonica are about equal in length to the leaves, and bear a terminal head of three to five flowers on long pedicels of varying lengths up to 4 inches. A lateral head of one or two flowers is occasionally produced about six inches below the top of the stem, as in I. longipetala. The spathe valves are very narrow, two-three inches long, clinging closely to the pedicels and becoming scarious and of a silvery-grey colour at flowering-time. The three-sided ovary is a little more than half an inch long, while the perianth tube scarcely measures as much as one-quarter inch.

The flowers resemble those of I. longipetala, but are slightly smaller, and less conspicuously veined. Both species have, however, a central ridge of the haft of the falls, sprinkled with purple dots on a whitish ground. As the narrow haft expands gradually into the blade the white ground becomes veined with violet-purple and bears in the centre a yellow blotch. Beyond this the veins spread and the colour becomes a little paler and covers the whole surface. There is some variation in the shade of violet-purple. The length of the falls is a little more than two inches, and the blade measures a little less than an inch across. The standards are narrow, oblanceolate, pointed, and not emarginate, about one and three-quarter inches long, violet-purple in colour. The styles are short with small triangular crests, and the stigma entire or only obscurely bilobed. The filaments and the anthers are both a pale mauve, while the pollen is cream-coloured.

The ripe capsules have thin membranous walls, like those of the other members of the group, taper slightly towards either end, and in section are roughly triangular, with slightly inflated sides. The seeds are dark brown, smooth, and pear-shaped, with a minute whitish circle or aril at the upper end.

May I, in conclusion, ask any American gardeners and botanists who may chance to see these notes to be so good as to send me a few seeds of any irises of this group of which they may happen to possess plants from known localities, or which they find growing wild. It is, I am sure, only by growing all obtainable plants side by side and by comparing them as they grow that the species can be separated and described in such a way as to differentiate them satisfactorily one from another.

I. arizonica is not, perhaps so striking a garden plant as I. longipetala, but it is interesting as a link connecting that species and its American relatives with one of the most widely distributed of Asiatic irises, namely I. ensata.

Iris Boissieri x tingitana.

("*The Gardeners' Chronicle*"—*November* 14*th*, 1914.)

In the early days of May it was a surprise to find an iris in flower that appeared to be a fine form of I. Boissieri. On looking up its number I found that so long ago as 1908 I crossed I. Boissieri with pollen of I. tingitana.

The foliage is weak and of a pale yellowish-green colour, which does not augur well for the constitution of the hybrid. However, five or six of the bulbs have flowered and shown little variation. The colour is an intense blue-purple, and the flowers are remarkable for their very flat outline and for the great breadth of the style branches.

The spathes are three inches long, keeled on both valves and scarious only at the tip. Each contains only one flower. The tube is slender and more than an inch in length. The blade of the falls is about an inch broad and bears a central line of orange-yellow, on which, however, there is no trace of the hairs which distinguish the seed parent, I. Boissieri. The large standards are of the same shade of blue-purple as the falls and incline outwards, contrasting with the distinctly red-purple of the style branches.

My object in attempting this cross was to see whether the scanty beard of I. Boissieri would remain constant in its offspring. In this first generation there is certainly no trace of the hairs, but I had hoped to obtain seeds from the plants and to raise eventually a second generation. The beard should then have re-appeared, if, as is not impossible, the character acts as a Mendelian recessive.

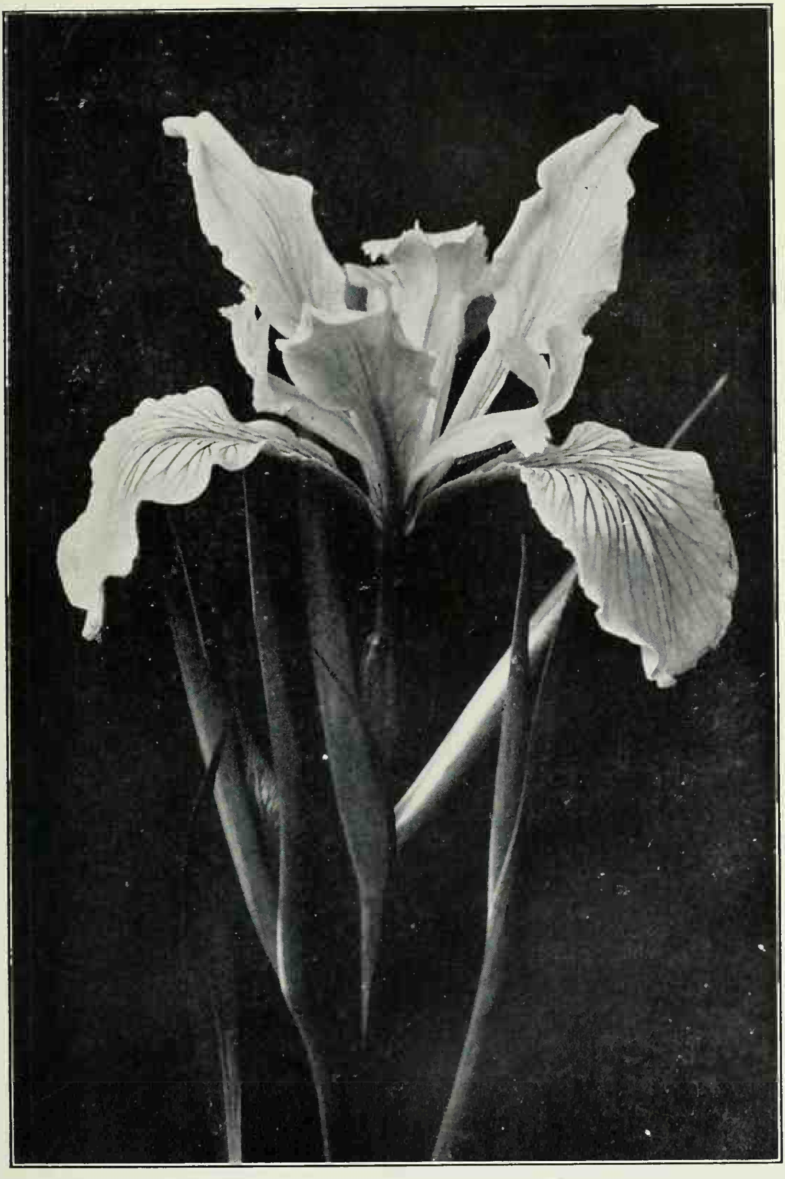
The plants have, however, proved to be sterile, for not one has set any sound seeds, though capsules were formed. This is in accordance with my experience of other hybrids between distinct species of iris. Sterility seems to be almost, if not entirely, absolute in every case, unless the species are closely allied. For instance, numerous crosses between new Chinese members of the sibirica group, *e.g.*, Forrestii, chrysographes, Bulleyana, have produced hybrids from which I have lately gathered abundant seed, while I. Wilsonii when crossed with the Californian I. tenax gives absolutely sterile hybrids, and another Sino-Californian cross, I. chrysographes x I. Douglasiana, gives the same disappointing result.

Californian Irises.

(" *Irish Gardening* "—*February*, 1913.)

Between the Pacific Coast and the Rocky Mountains there is found a well-marked group of irises to which the name Californian may be not inconveniently applied. Its members are perhaps better suited to the climatic conditions of Ireland than those of any other division of the genus, for even in England the foliage of several of the species remains green throughout the winter, unless the frosts are exceptionally severe. Moreover, the slender wiry rhizomes do not seem to demand that baking by the sun in summer which is almost essential to the well-being of these species whose rhizomes are large and fleshy.

The reason why the irises that form this group seem to be comparatively little known lies in the fact that they do not lend themselves easily to transplantation. The slender rhizomes send out few root-fibres and the plants are therefore



IRIS WATSONIANA

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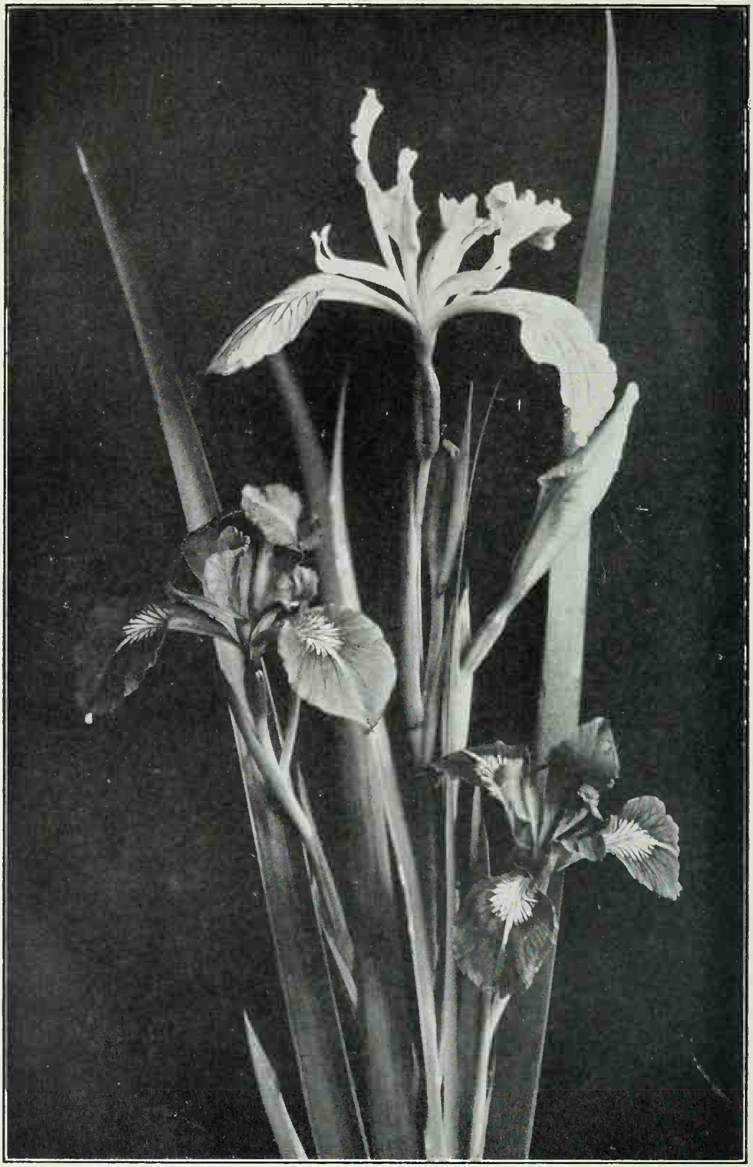


IRIS BRACTEATA

IRIS TENAX

See page 9 and index

slow to establish themselves in new quarters. In addition to the paucity of the root-fibres, another difficulty lies in the shortness of the period during which they are formed. If the plants are torn up in autumn, root-growth will be found to have entirely ceased, and the plants, making no attempt to establish themselves, invariably perish. It is only while leaf-growth is active between March and early September that transplantation has any chance of being successful.

Fortunately, all the species set seed readily, and young plants when put into the open ground in summer soon grow to flowering size. The soil should be light and relatively rich in humus, but care must be taken that it is free from any considerable proportion of lime.

With regard to the species that form the group, it is possible to recognise two sub-divisions, of which the best known examples are I. longipetala and I. Douglasiana. Of these, the former is only found along the Californian coast in the region of winter rain and heavy sea mists in summer. The stems rise to a height of two to three feet and usually bear only one head of flowers, from which, however, emerge in succession as many as four or five blooms. The large falls are conspicuously veined with deep purple on a white ground, while the oblong standards are of a uniform pale purple colour. They are of a curious and characteristic shape, having a blunt upper end with a wide and deep indentation at the centre. The foliage is of a deep green, somewhat stiff and nearly as long as the stems. Moreover, the plants begin to grow in the autumn, sending up their new growths before the old leaves have withered entirely away. Accordingly, they are practically evergreen.

Differing from I. longipetala, chiefly in its habit of growth, there is a closely-allied species which occurs further inland and which behaves as a mountain species by losing its foliage entirely in the autumn and lying dormant until the spring. The leaves never attain the length of those of I. longipetala and are always considerably shorter than the stem. The flowers, however, except for being somewhat more slender, are indistinguishable from those of that species. This is the plant to which Nuttall gave the name of I. missouriensis, and it is necessary to distinguish it carefully both from I. longipetala of which it is apparently only a sub-species, and from another plant to which Nuttall gave the name of I. montana, although it is uncertain whether he ever actually published a description of the plant. Fortunately, his original specimens both of I. missouriensis and I. montana are still preserved in the

British Museum and there seems little room for doubt as to their identity. I. montana differs from the two species already described by its lanceolate and not truncated standards and by the fact that the colouring of the falls is more uniform and less conspicuously veined. Moreover, the flowers bear a distinct yellow patch on the blade of the falls. The plant is sometimes to be obtained from the nurserymen under the name of I. tolmeiana or missouriensis, while the true missouriensis has been in cultivation as I. longipetala *var.* montana.

The other group, of which I. Douglasiana is the most vigorous and the best known, contains a number of beautiful species well suited for cultivation in large rock gardens in warm aspects with rich, light soil. I. Douglasiana gives rise to innumerable colour varieties when it is raised from seed, which is by no means a difficult process, for the plants set seed abundantly, probably as the result of self-fertilisation, and the seeds germinate as readily. The colour varies from a pale buff-yellow through pale mauve to deep violet-purple. The flower stems are numerous and strong plants produce spathes each containing three flowers, so that the display lasts for a considerable time. The foliage is striking, being at its best in late autumn, and then dying off gradually a bright red colour by the time the new growths push up in March. This iris only grows near the Pacific coast of California.

Further to the north, in Oregon, is found another beautiful and very floriferous species, I. tenax, which has probably suffered from a suggestion that was once made that it should be cultivated in half shade and in moist soil. These conditions do not suit it at all, for it requires a warm, light soil, and some sunshine. Then in June, the foliage is literally hidden by the flowers, varying in shade from a pale pearly grey, to the deepest claret-purple. Unfortunately, it is my experience that after two or three such lavish displays the plants tend to exhaust themselves. Since, however, seed is usually abundant, it is an easy matter to raise fresh batches of seedlings from time to time. Probably too, a little care in removing dead flowers and so preventing the formation of seed would tend to prolong the life of the plants.

I. bracteata and I. Purdyi are an interesting pair of species. Both are, unfortunately, rare, since they object most strongly to any disturbance once the plants have reached maturity. In typical specimens of both species the flowers are yellow veined with crimson-purple. The deep green foliage is very scanty and tough, and the chief difference between the two is that in I. bracteata the perianth tube is quite short and funnel-shaped, while in I. Purdyi it is slender and about an inch in length.

I. macrosiphon, as its name implies, has a long perianth tube three inches in length. It is a very rare plant but one of the most beautiful ; it is also very floriferous and produces endless colour forms. The foliage is very narrow and of a curiously glaucous bluish-green.

The somewhat insignificant plant that goes by the name of I. Hartwegii has pale straw-coloured flowers of no great merit. It is possible that it is only a local form of I. tenax ; at any rate a purple-flowered form of it is said to grow in the San Bernardino mountains in Southern California, and I have failed so far to distinguish dried specimens of this from typical I. tenax.

The two remaining numbers of this group are I. tenuis and a hitherto unpublished species probably of little value as a garden plant. Neither has apparently been as yet in cultivation in England, although I hope that I have at last succeeded in obtaining seedlings from the latter.

Some Californian Irises.

(" *The Gardeners' Chronicle*"—*July 23rd*, 1910.)

The various species of iris native of the Western States of America seem to be less well-known and less generally cultivated than they deserve to be. The chief reason for this neglect appears to be that they do not lend themselves to the nurseryman's habit of moving all herbaceous plants in the autumn. If the plants are uprooted then, the more delicate of these species invariably die. They are somewhat erratic in their behaviour at any time, but, if treated carefully, they may be moved with very reasonable success at any time from April till early September, though, by preference, I should choose the earlier part of this period for the operation. By careful treatment is meant that the young root-fibres must not be ruthlessly trimmed off after the neat fashion in which iris rhizomes arrive from Holland, for the slender rhizomes send out comparatively few of these fibres, and if these fibres are mangled, the plant stands little chance of re-establishing itself in new quarters. These irises are best suited in a light soil that is free from lime and rich in humus.

It is a curious fact that American irises seem to go in pairs, the individual members of which are, in most ways, identical, though their other characters are so distinct that we cannot group them together as one species. Of such pairs, I. bracteata and Purdyi, I. longipetala and missouriensis, I. Watsoniana and Douglasiana, I. hexagona and hexagona Lamancei are examples, though the two latter, are, of course, natives of the Eastern States.

I. bracteata is one of the most beautiful of all irises. It derives its name from the fact that its stem is clothed in short, leafy bracts, and its evergreen habit is certainly a point in its favour. The flowers are yellow, veined conspicuously and yet delicately with a colour that comes very near to crimson, while the deep-green, glossy leaves set off the flowers to great advantage. I. Purdyi is very similar. The leaves are rather narrower and shorter, but the flowers bear the same crimson veins on a yellow ground, although in this case the shade is a little lighter. In both species the pointed falls are held horizontally, and the only real difference lies in the fact that, in bracteata the perianth tube is very short while in Purdyi it is nearly two inches in length. The plants are obviously different when growing side by side, and yet it would be very difficult accurately to define the difference between them if it were not for this distinct feature of the length of the tube.

I do not know of any record of any other hybrids of bracteata, but this year I have had in flower here a dwarf plant which bore six or seven stems of beautiful pink flowers of the characteristic shape of bracteata. The pollen parent I cannot give, as the seed parent would seem to have fertilised naturally. It was growing in close proximity to both Douglasiana and tenax, and I incline to think that, to judge from the dwarf, somewhat spreading habit of the foliage, the pollen must have been that of Douglasiana. However that may be, the hybrid is certainly far more floriferous than its mother and a delightful plant for a sunny corner in a rock garden.

I. Hartwegii is one of those species which catalogues describe as of botanical interest, meaning of course that they do not wish to be uncharitable to any plant. The small flowers are of a pale straw colour, and two or three are produced on a slender but wiry stem four or six inches long. My plants are growing where the seeds were sown in the open, and they are apparently quite hardy, at least in a light soil. They have flowered well, both last year and this, and I hope they will consent to give me a fresh stock of seeds before any evil fate overtakes them.

I. chrysophylla, from Oregon, looks a picture of ill-health, and yet, since it flowers annually, I am beginning to think that its yellow leaves are enough to distinguish it from macrosiphon, with which it agrees in many ways. The stem is short, but the flowers are borne upon a long tube over two inches in length. They are of a creamy-white, with a few golden veins in the centre of the falls that seem to sparkle in the sun.

I. tenax is so called because of the wiry fibres of its leaves, which the Indians used to twist into twine of considerable strength. The stems rise well above the leaves, and bear comparatively large flowers, which may vary in colour from the palest pearly-grey, through delicate shades of mauve, to a deep, rich, claret tint. This really valuable plant suffers, I believe, from a note as to its cultivation in a certain popular book on the Iris, which describes it as thriving in peat kept moist with sphagnum in partial shade. Under these conditions my plants certainly did not thrive, but in dry sand, in a sunny position, they thrive amazingly and flower well.

For some time, I have been trying hard to solve the mystery of the longipetala, missouriensis, tolmeiana group, but only become more and more puzzled and must obtain more material before coming to a definite conclusion. The examination of a large number of herbarium specimens, collected in different localities, has not thrown much light on the subject, but I incline to think that what was first described as longipetala has deep-green leaves of lax, almost evergreen habit, longer than the stem, which always bears more than two flowers on pedicels of unequal length, while missouriensis was applied to an earlier flowering plant with somewhat yellow-green leaves, which are more or less erect at flowering time and distinctly shorter than the stem, which bears only two flowers. This theory, however, received a shock this year when a batch of seedlings raised from Californian seed and having the foliage of missouriensis produced the inflorescence of longipetala. It is possible that the seed was from plants that had accidentally become cross-fertilised ; unless this was the case it would seem almost impossible to keep up any distinction between the two species. I am endeavouring to raise a second generation from these plants, and the results ought ultimately to throw some light on the question of the validity of the two names.

Iris macrosiphon I have never yet had in cultivation, but from all accounts, and to judge from herbarium specimens, it must be a desirable plant. It varies much in colour and is readily distinguished by the long (two to three inches) tube.

I. Douglasiana and Watsoniana are obviously very similar, not merely local forms of the same species. Both have practically evergreen leaves with pinkish base, that are at their best in winter, but while those of I. Douglasiana are narrow and lax, those of I. Watsoniana are broad and stiff, and spread in almost horizontal, fan-shaped tufts. A number of seedlings that I have raised here from plants of uncertain origin seem to show that these characters in the foliage are transmitted unchanged, but the plants are in other respects so similar that they hardly deserve to rank as more than subspecies. The colour of the flowers is extremely variable. It may be a deep, rich violet with white veinings on the upper part of the blade of the fall, or these markings may be almost wholly absent. Other plants bear flowers of a pale lilac or lavender shade, and yellowish examples are not unknown. One fine, large-flowered seedling has almost white flowers, with a faint tinge of lilac, while another is heavily veined with violet on a silvery-white ground, producing a flower not unlike a small longipetala. Such seedlings flower in one or two years at the most from the time the seeds germinate, and it may be that this fact has only to be more widely known than it appears to be to induce many gardeners to embark on the fascinating pursuit of raising irises from seed.

Iris Carthusian.

(" *The Flower Garden.*")

It may be as well to put on record the parentage of this Iris as it is in some danger of being lost.

Twenty years or more ago now, some iris rhizomes were sent to a Charterhouse master by a brother from Mardin in Armenia. When the plants developed they proved to be I. Gatesii and a bearded iris, which I subsequently described as mesopotamica. The latter proved difficult to grow and only did well after a hot summer. Some of the plants were given to J. W. Marshall, another master, and he crossed a flower with pollen of pallida dalmatica and Carthusian is the result of the cross. In this country it has never done well except after a hot summer, and I have just had a letter from my old friend and colleague Mr. Marshall, who tells me that his plants have done better this year after the extraordinary baking they had last summer.

I. Lop-tec. I. acutiloba x I. Korolkowi.

(" *The Gardeners' Chronicle*"—*June* 18*th*, 1910.)

I. LOP-TEC.

When, in June 1908, I pollinated with pollen of Iris tectorum a flower or two of the dwarf I. pallida, which Sir Michael Foster obtained from Monte Loppio, I hardly expected to get any result, for experience has shown that among irises it is only members of the same group that hybridise at all readily. However, I obtained a pod of sound seed and from this seedlings were raised early in 1909. Of these, the strongest (Lop-tec) has just come into bloom for the first time, and it is obvious that tectorum pollen has had a very considerable influence.

The leaves attracted my attention from the first, for, although they are similar in shape to those of Loppio, in colour and substance they resemble those of tectorum. Of the inflorescence it is unwise to speak until the plant has had a chance of more complete development after another year or two's growth. The spathe valves are narrow, pointed and keeled, green at back and scarious at the edge, thus combining the characteristics of the two parents, the spathes of I. tectorum being green and pointed, and those of Loppio blunt and scarious. The perianth tube is short like that of I. Loppio, but of deep violet-purple colour as in I. tectorum.

The flower itself looks at first sight like an I. tectorum of somewhat sombre colouring. The segments are all approximately equal, and the standards are spread out at the same angle as the falls. The colour is a curious dull purplish-lilac found in I. Loppio, and the mottlings always found in I. tectorum are entirely absent. Before the bud opened my chief curiosity was to see whether the beard of Loppio or the crest of tectorum had prevailed, and I was not a little surprised to find that neither has really proved itself dominant over the other. The white, purple-mottled crest of tectorum is there on a reduced scale, and the beard of Loppio appears in the brownish-yellow hair-like processes, which crown the top of the crest. The verdict of Mendelism on this result would appear to be that the beard and the crest do not form a pair of Mendelian characters.

On the whole, I. tectorum, the pollen parent, has had a much more marked influence than I. pallida, the seed parent. It would no doubt be interesting to go on to the next generation by self-fertilising the present plant, but unfortunately the anthers contain no pollen, as I also found to be the case in another inter-group hybrid, namely I. olbiensis crossed with pollen of I. Korolkowi.

I. ACUTILOBA x I. KOROLKOWI.

The result of this cross is a group of particularly pleasing plants. The seeds ripened in 1907 and germinated (freely for an Oncocyclus) in 1909. The young plants came well through last winter, quite unprotected, and several have recently flowered. In habit the plants resemble small specimens of I. Korolkowi, the brown-purple coloration at the base of the leaves being present in some cases. The stem, about twelve inches in height, bears a two-flowered spathe, and the flowers retain the characteristic shape of I. acutiloba, with connivent standards and almost horizontal falls. All the segments are pointed, as in acutiloba, and boldly veined with a warm shade of chocolate-brown on a white ground.

It is noteworthy that in this case the influence of the pollen-parent has been strong enough to produce a two-flowered, instead of a one-flowered, spathe, and the theory that the Oncocyclus and Regelia group of irises are closely related would seem to be supported by the fact that hybrids between their members appear to be fertile.

Chinese Iris (Three New).

I. WILSONI. I. FORRESTII. I. BULLEYANA.

(" *The Gardeners' Chronicle* "—*June 25th*, 1910.)

The richness of the Chinese flora is indeed extraordinary, and thanks to the enterprise of Mr. Wilson and Mr. Forrest, our gardens are rapidly being enriched of its treasure.

For some years I have been hoping that sooner or later we should obtain a yellow-flowered relative of Iris sibirica, for there appears to be considerable evidence that the blue-purple colouring matter of many irises is of very nearly the same composition as the yellow of others. I am told, and I can well believe, that the chemical question involved is extremely delicate and complicated, but its solution might be of great value.

In the " *Kew Bulletin* " for 1907, *p.* 321, Mr. C. H. Wright described Iris Wilsoni from specimens sent to him by Messrs. Veitch, of Chelsea. Last year this firm very kindly allowed us to have a plant of this iris, which, on June 7th, began to bloom freely. By a lucky chance another Chinese iris, collected by Mr. Forrest, and sent to me by Mr. A. K. Bulley, also came into flower on the same day, and this plant I propose to name I. Forrestii. Both these irises have yellow flowers, and they are both closely related to I. sibirica and I. Clarkei. They are distinguished, however, by the following characteristics. In I. Wilsoni the flowers are borne on long pedicels, as in the western forms of I. sibirica ; in I. Forrestii the pedicels do not exceed an inch in length. In the former the styles are very narrow, and the standards spreading, as in I. Clarkei, with the edges of the blade curiously crimped, while in the latter the styles are broader than the haft of the falls, and the standards almost erect, with smooth blades. The foliage also of the two plants is quite distinct, that of I. Wilsoni resembling the growth of the Oriental forms of I. sibirica, while the leaves of I. Forrestii are narrow and grassy and, moreover, have the polished upper surface and glaucous under-surface, which are so marked features of I. Clarkei. Moreover, I. Wilsoni grows to twice the height of I. Forrestii.

IRIS WILSONI.

The hollow stems are about two feet in length, barely overtopping the leaves, bearing a reduced leaf usually below the centre, and a two-flowered spathe above the pointed green valves out of which the flowers rise on solid pedicels two to four inches long. The ovary is small, trigonal, dark green, with a shiny surface, and a tube of the usual sibirica shape, of about the same length as the ovary.

The falls have a broad haft much veined with red-brown on a bright yellow ground. This colouring extends in a semicircular patch on to the oblong blade, which then becomes pale yellow, with faint purplish veins. The standards, which are poised at an angle of 45 degrees, have a very narrow, deeply channelled haft as long as the much crimped blade, the colour of which is pale yellow with faint purplish markings. The narrow styles are bright yellow, and the crests small, quadrate and overlapping.

IRIS FORRESTII.

The leaves are grassy, linear, about ten to twelve inches long by a quarter of an inch broad, with a smooth polished upper and a glaucous under surface. The numerous stems are about twelve inches in height, bearing one or two reduced leaves below the centre, and a single head of one or two flowers ;

they are hollow, but owing to the thickness of the walls the central space is much smaller than in its allies. The spathe valves are green, pointed, keeled, two to three inches long, containing one to two flowers on solid pedicels about one to one and a half inches long. The ovary is pale green, trigonal with markedly hollow sides, slightly longer than the broad many-sided tube.

The falls have a short (one inch) horizontal haft, bearing broken veins of dark red or purple-brown on a yellow ground. This colouring projects as in I. Wilsoni in a half-circle on to the oblong blade (one and a half inches long by one inch broad) which is separated from the haft by a sharp constriction. The blade drops perpendicularly, and is of a pale, lemon-yellow, sometimes slightly marked with faint purplish veins. The standards are erect, with channelled haft and oblanceolate, pale yellow blade. The styles are also pale yellow, somewhat discoloured with purple, broader than the hafts of the falls, much arched and bringing the broadly triangular stigma close down on to them. The crests are small, quadrate and overlapping.

IRIS BULLEYANA.

The third new Chinese species, to which I propose to give the above name, supplies a link between I. sibirica and I. Clarkei, for it has the hollow stem of I. sibirica, although in foliage and growth it is very similar to I. Clarkei.

The plant that I received from Mr. Bulley last autumn has not flowered, but he has very kindly sent me a flowering specimen. However, as the plant was uprooted some days before the bud opened, I hesitate to give its full description, and will merely describe it provisionally as an ally of I. Clarkei, with flowers of which the standards are blue-purple and the falls mottled with the same colour on a creamy ground.

As regards habitat I. Wilsoni was found by Wilson at Fang, in the Province of Hupeh, in Western China, I. Forrestii in open mountain meadows on the eastern flank of the Lichiang range in North-west Yunnan. At present I am unable to state the precise locality in which I. Bulleyana was collected, although if my recollection is right it was in Yunnan.

Mr. Farrer's Chinese Irises.

I. FARRERI. I. HENRYI. I. RUTHENICA. I. GONIOCARPA. I. FELINA.

(" *The Gardeners' Chronicle*"—*April 3rd*, 1915.)

By the kindness of Professor Bayley Balfour, I have recently had an opportunity of examining the dried specimens of the irises which Mr. Farrer collected last year in Western China, and described so enthusiastically in his letters already published in these columns.

I remember wondering, as I read the letters, what the irises could be that Mr. Farrer was describing. It was difficult to identify them with any confidence, and yet it seemed unlikely that any large proportion of them could be new and unknown species, in view of the fact that Western China has been fairly extensively explored by botanical collectors in recent years. The later collections sent home by Messrs. Forrest and Purdom have not contained any novelties among the Iris family, and it almost seemed as though even Western China no longer contained any botanical surprises.

As was only to be expected, Mr. Farrer encountered in South Kansu the ubiquitous Iris ensata (*see* " *The Gardeners' Chronicle*," *October 26th*, 1914, *p.* 213), which he described as giving, in some places, a blue tinge to the country side. His specimen, No. F. 29, shows that this iris there produces its flowers while the leaves are only four to six inches in length and therefore barely as tall as the flowers themselves. In England, it is rare that the climatic conditions allow I. ensata to flower in this way, though the plants do occasionally attempt to send up their flowers with the leaves. The attempt is usually disastrous, owing to late frosts, and the plants then learn wisdom and keep back their main display until the leaves have grown to a foot or more in length, and provided more shelter for the delicate flowers. In countries where the change from winter to spring is sharper and more decided than it is in these islands it is obvious that I. ensata is able to send up its flowers simultaneously with the leaves, instead of hiding them among the almost full-grown foliage.

Iris Farreri Sp. Nov.

The only other iris to which Mr. Farrer gave a well-known name was I. graminea (*see* " *The Gardeners' Chronicle*," *September 12th*, 1914, *p.* 185). " More generous is I. graminea, which abounds in the sere, fine herbage of high, hot downs, and now enriches their brown expanse with here and there a dainty, spidery cup of amethystine blue, suggesting a crocus torn in strips, or I. reticulata, diminished and made anaemic." This was a puzzle, for I. graminea was not known to grow east of the Caucasus, and yet it seemed hardly possible that any other iris could have been mistaken for this well-known species, with its plum-scented flowers and curiously flattened stem, which at once distinguish it from all others. Partly by the process of elimination and partly from the superficial resemblance of the plant and flowers to I. graminea, I feel that we may, with some confidence, identify No. F. 325 with the plant described above. The label on the sheet says: "Abundant by the upland tracks and in open places in the hill valleys of the Min S'an, not below nine thousand feet, nor above ten thousand. July 20th (lingering)." This iris, however, is not I. graminea, but an unknown species to which the name of Iris Farreri may perhaps not inappropriately be given. This species obviously belongs to the Spuria group, with the members of which it agrees in possessing the ovary with double ridges at each angle, the sharply two-pointed stigma, the orange-red pollen, and the oval blade of the falls separated by a constriction from the long oval haft.

At first sight I. Farreri bears a far more striking resemblance to the Balkan I. Sintenisii than to I. graminea, from which it is separated at once by the stem, which is apparently not flattened, and by the long tapering neck to the ovary, a feature which is conspicuously absent in I. graminea. The foliage, too, as far as can be seen from the dried specimens, lacks the polished upper surface which is so marked in I. graminea. From I. Sintenisii and I. Urumovii it is less easy to separate this new iris. It differs chiefly, however, in the thin texture of the spathes, of which only the outer valve appears to be keeled and that but slightly, and in the narrow, slender, somewhat flimsy foliage. In I. Sintenisii the leaves are noticeably tough and leathery and in I. Urumovii they are very stiff, rigid, and glaucous. The character of the rhizome is not wholly apparent from the available specimens, but the fibrous remains of old leaves that sheathe the base of the growths suggest an affinity in habit to I. songarica, another Eastern and outlying member of the Spuria group. I. Farreri is distinguished from I. Kerneriana by its narrow leaves, by the rounded and not pointed blade to the falls, and probably by the character of the rhizome.

The stem of I. Farreri is about eight inches long, and bears a single head of two flowers. It is closely clothed in about three reduced leaves. The spathes are nearly four inches long, narrow, tapering to a fine point, not at all scarious at flowering time, and with a transparent margin in the upper part. Only the outer valve seems to be slightly keeled. The pedicels are one and a half to two inches long, and the six-ribbed ovary has a tapering neck about half an inch long.

The flowers apparently bear a striking resemblance to those of I. Sintenisii, as far at least as can be seen from the dried specimens. The panduriform fall is about one and three-quarters of an inch long, the small blade being separated from the haft by the constriction characteristic of the Spuria group. The blade is closely veined, and probably minutely dotted, with blue-purple on a grey white ground. The sides of the haft are veined, and the central portion dotted in the same way. The narrow, oblanceolate standards are about as long as, or slightly shorter than, the falls, and of a slightly redder shade of purple. The styles also are of a redder purple, and the stigma consists of two sharply-pointed teeth, as in all members of the Spuria group, with which I. Farreri also agrees in having bright, orange-red pollen. The crests of the style are broadly triangular, and not long, narrow and tapering, as in I. songarica. The foliage is narrow, being barely three-eighths of an inch in width, but it overtops the stem, some leaves being as much as eighteen or twenty-four inches long. In their finely-ribbed texture, the leaves resemble those of I. humilis or I. Urumovii.

IRIS HENRYI.

We can now pass on to those irises to which Mr. Farrer either gave new, provisional names, or which he left unnamed. The first is that described on *p.* 258, October 17th, 1914, as a " little grassy-leaved, white iris, apparently of Pavonia relationship, the six segments being so rounded, and occasionally so equal, as to make almost the effect of a small and starry narcissus." The " relationship " to pavonia is somewhat misleading, because the so-called I. pavonia is not an iris at all, but a bulbous plant whose proper name appears to be Moraea pavonia. Mr. Farrer was thinking only of the markings on the falls and not of the habit of the plant. Of this iris the dried specimen is numbered F. 19, " pavonina," and accompanied by the following note :—" Abundant in the hot and very coarse turf at six thousand feet on the torrid hills opposite Kiai Chow, April 29th. Alas ! we could not manage to secure either plants or seeds." This small iris has a slender, wide-running rhizome very similar to the underground stems of the couch grass. Each tuft of six or eight slender leaves produces a single stem, four-six inches in height, with a single, two-flowered spathe. The valves are entirely green when the flower is expanded, and though they are an inch or more in length, yet the pedicel is even longer, so that the ovary is exposed above the spathes. The tube is very short.

This is I. Henryi, Baker, of which hitherto there have only been available such dry herbarium specimens that it has been impossible to say even whether the flowers were yellow or lilac. Mr. Farrer's specimens, however, are so fresh that there is little doubt that the flowers are either creamy-white or pale yellow. Mr. Farrer tells us in his somewhat picturesque language that the falls have a " delicate peacock eye of gold, outlined with a rim of blue that sometimes faintly suffuses all the flower." Of these details there is, unfortunately, no trace left in the dried specimens. The similarity of the segments in shape to those of I. minuta is very striking, but there can be no excuse for confusing the two species, for in I. Henryi the pedicel is long and the tube very short, while in I. minuta the tube is longer than the pedicel.

Other details which these specimens add to our previous knowledge of I. Henryi are :—Styles, narrow, oblong, with a raised central keel, pale creamy-white ; stigma, triangular ; filaments, apparently equal in length to the anthers ; filaments, anthers and pollen all creamy-white.

IRIS RUTHENICA.

In " *The Gardeners' Chronicle "—September* 12*th*, 1914, *p*. 185) Mr. Farrer described an iris in the following terms :—" All the roadsides are carpeted with hassocky tufts of a little iris that never seems to flower over half the country, though very occasionally one comes upon isolated stretches of it where the low, wide cushions of broadish foliage are thickly set with seed capsules." This iris may perhaps be identified as I. ruthenica, which does produce low cushions of leaves, and some forms of which do appear to flower very shyly, while others, and especially the broad-leaved forms, flower abundantly. No. F. 55 is a specimen of I. ruthenica, and Mr. Farrer's note is as follows :—" Seen only once, May 3rd, at one point in the Dung Lu Ho Valley at about six thousand feet, straying about in fine grass and amid very scanty scrub, on a small level space by the wayside above the river." I. ruthenica is a very widely-distributed iris, for it is found as far west as Transylvania, and as far east as Manchuria, and it is also common in the Altai Mountains and in Western China. The free-flowering forms are very desirable, and probably would soon be better known than they are if the fact were once grasped that it is almost certainly fatal to attempt to move this iris in the autumn, although it may be moved with every chance of success soon after the flowers have faded. It is equally easily raised from seed.

IRIS GONIOCARPA.

There remain to be considered the two irises to which Mr. Farrer introduced us at *p.* 318, November 14th, 1914. " One which occurs also at lower elevations is sturdier and stockier in growth than the other, with large flowers, and the falls brindled and mottled tabby-like, so that I think of her for the present as I. felina ; more entrancing yet are the fairy-like elegance and the profuse wiry stems of the other, whose waxen snowy falls are hemmed and dotted with deep velvet spots of pure violet, till one can call it nothing else but I. pardalina." Mr. Farrer has sent home dried specimens of both these Irises, F. 90, I. " pardalina," and F. 124, I. " felina," and, after a careful examination of them, it seems impossible to look upon them as anything more than two local forms of Baker's I. goniocarpa, of which Maximowicz's name of I. gracilis is a synonym. This species is known in Sikkim and the Chumbi Valley ; it is also found in Tibet and the Chinese provinces of Szechuan, Kansu and Shensi. The forms from these different localities vary in size and sturdiness, just as do Mr. Farrer's two forms, but mere size is hardly a sufficient reason for bestowing specific rank. Both sets of specimens show the features which are characteristic of the section of Pseudoregelia Irises, to which I. goniocarpa belongs. These are the curiously-mottled flowers found also in I. kumaonensis and in I. Hookeriana, which are so abundant in the Alpine valleys of Kashmir and Kumaon, the oblong, blunt ended standards and the curious, membranous sheaths that clasp the bases of the tufts of leaves. Mr. Farrer's description of his I. " pardalina " as having " waxen, snowy falls " shows how difficult it is to convey a right impression of colour by mere words. The dried flowers of both this iris and of " felina " are practically of the same pale purple colour, with the conspicuous darker mottlings and blotches.

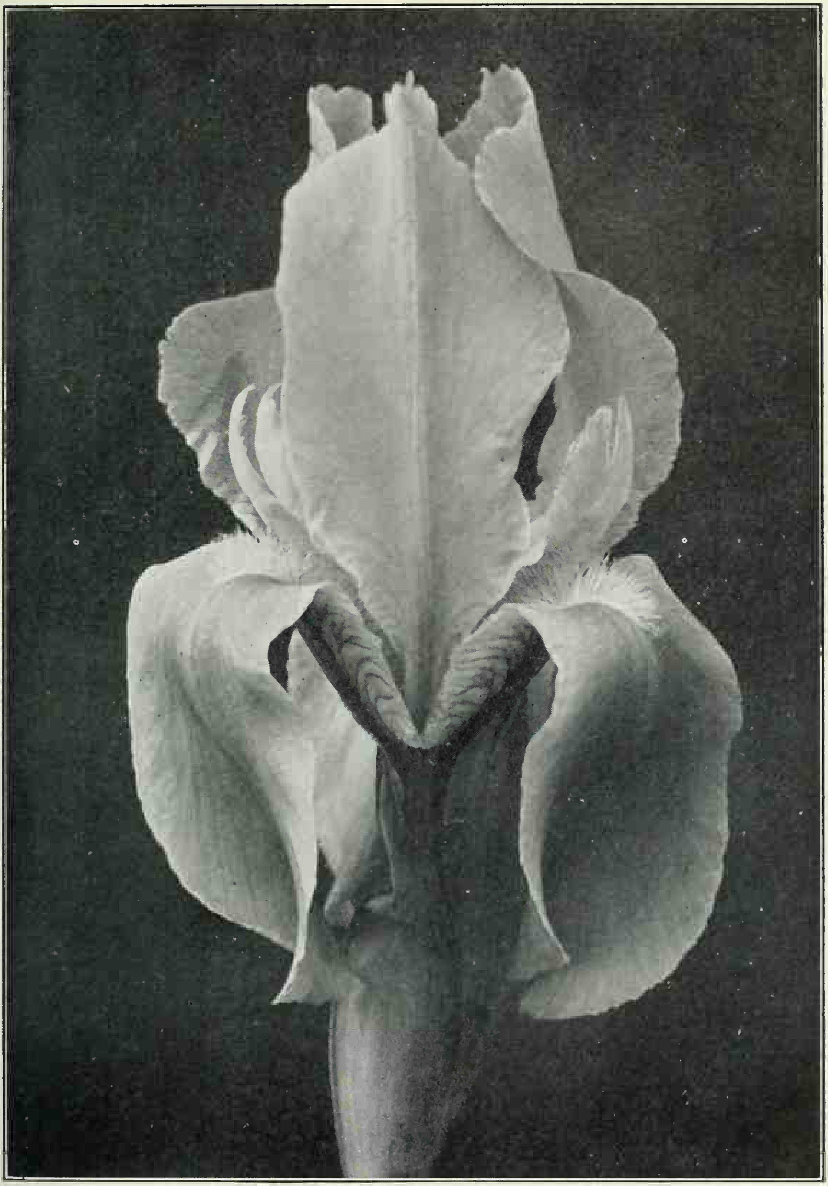
If we take a more familiar instance, we shall see at once how the same flower may be described in two totally different manners by looking at it from different points of view. I. histrio and I. histrioides are usually described as blue irises with some white markings, but it is equally true to describe them as having white falls almost wholly covered with blue blotches and veins. The possibility of describing the flowers in these two ways accounts for the description of I. " felina " as being " brindled and mottled tabby-like," while it is also shown in " *The Gardeners' Chronicle,*" *November* 14*th*, 1914, *fig.* 128, as having " flowers white, with deep violet-coloured spots," the latter being precisely Mr. Farrer's description of I. " pardalina."

It is interesting to notice that the difference in habit between these two forms of I. goniocarpa is precisely that which we should *a priori* expect from the different positions in which they grow. I. " felina," which comes from the open among limestone rocks, is usually found in the higher positions ; it has fewer leaves, which are overtopped by the stems at flowering time, as is also the case with both I. kumaonensis and I. Hookeriana. It has also larger flowers than I. " pardalina," which grows lower down in " very much coarser, longer turf." Here the flower-stems develop more slowly, instead of rushing up immediately the snow melts, and the leaves are consequently as long as, or a little longer than, the stems, and the flowers are smaller.

Iris Chrysographes.

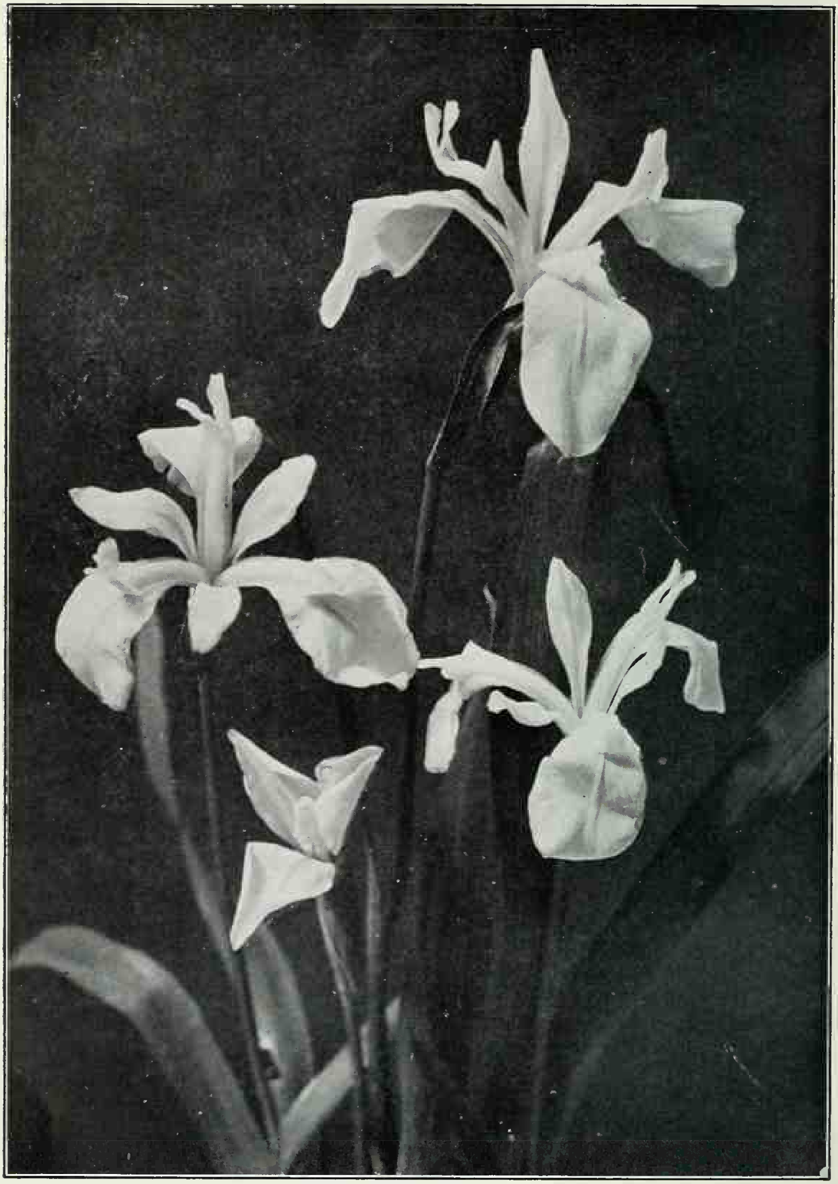
(" *The Gardeners' Chronicle* "—*June* 10*th*, 1911.)

This new Chinese species is a member of the sibirica group, and very closely allied to I. Forrestii, which was described and illustrated in the columns of " *The Gardeners' Chronicle,*" *June* 25*th*, 1910, *p.* 418, *fig.* 190. It differs from the latter in habit and in flower-colour, the tufts of leaves being much less closely set, and also in the fact that it flowers a week or more in advance of Forrestii. The flower of I. chrysographes is of the richest dark red-purple, very velvety in texture, and set off by the central and broken flanking lines of gold, which suggested the name of the species. The falls are very large and long (three inches) and the blade, which is twice as long as the haft, droops almost perpendicularly. The haft is flanked at the base by the curious flanges which are so characteristic of the sibirica group, and it is faintly marked with gold on a red-purple ground.



IRIS HOOGIANA

See page 116 *and index*



IRIS LÆVIGATA

See page 8 *and index*

The style branches are much arched to bring the triangular tongue of the stigma down on the haft, and are also arched laterally and sharply keeled.

The standards are long and narrow, poised at an angle of about forty-five degrees, and point downwards, as in I. Clarkei and I. Delavayi.

The stem is about fifteen-eighteen inches long and bears one or two reduced leaves. It is not as hollow as are the stems of I. sibirica or I. Delavayi ; on the other hand it is not wholly filled with pith, but has a distinct channel running down the centre. The stem does not appear to branch, and bears only the terminal head of one or two flowers borne on long pedicels in long, narrow, green spathes, three inches or more in length.

The tube is short and thick, about half an inch or rather less in width and about fifteen-eighteen inches in height. The leaves are not, however, rigid, but curve gracefully outwards, so that the flowers rise well above them.

This iris was discovered by Wilson in 1908 in China, growing in thickets to the west of Kuan Hsien in West Szechuan, at a height of from seven to eleven thousand feet. Herbarium specimens bear the number 1,304.

My plants were raised from some seedlings given to me by Miss Willmott about two years ago, and do not show any marked variation except in the amount of golden veins and dashes on the blade of the fall. In some examples these are numerous, but in others they are reduced to little more than the conspicuous central golden line. Dried herbarium specimens are seldom safe guides to the colour of irises, but from some of the specimens collected by Wilson, there is reason to believe that there are some forms of this species in which the ground-work of the falls is of a paler colour much blotched with a darker shade. It is doubtful, however, whether any colour-form of this sort could surpass in richness the brilliance of the deep purple type. It is one of the most richly coloured irises that we possess, and gives promise of proving an excellent garden plant.

It is, moreover, very floriferous, for several of the plants that are now flowering for the first time bear four or six flower stems. This number is not often exceeded in seedling irises, though one large pink-flowered seedling of I. bracteata has produced eleven stems at its first flowering, while a dwarf Pogoniris from the Balkans created a record by producing no less than thirteen flower spikes within thirteen months of the time when the seed germinated.

Some Hybrids of Iris chrysographes.

(" *The Gardeners' Chronicle*"—*September 16th*, 1916.)

Iris chrysographes is, without doubt, the most striking and beautiful of the group of new irises belonging to the sibirica section which has recently been introduced from Western China. It is unique in its rich royal-purple falls, on which the gold markings are always more or less apparent. In the poorer forms there is merely a central streak of gold, but in good specimens the veining is much more conspicuous, extensive and effective. Curiously enough, it seems to be the case that the amount of veining varies on the flowers produced by the same individual plant in successive years.

In matters of taste an individual opinion is of little value, but I cannot refrain from recording my impression that, among irises at any rate, the general rule holds good that, as regards purity of colour and grace of bearing, the wild species are preferable to the hybrids raised from them, whatever gains the hybridiser may obtain from other points of view.

The first crosses of I. chrysographes to produce flowers were made between the species and the dwarf, yellow-flowered I. Forrestii. The resulting hybrids are practically indistinguishable. In both cases the flowers are of a duller, bluer shade of purple than I. chrysographes, and, though the falls are smaller and less conspicuously drooping, the gold veining at the throat is a conspicuous feature. Both hybrids are free-flowering and would, I think, in moist soil be more vigorous than either parent. A cross made in 1914 between I. Wilsoni and I. chrysographes has recently come into flower. The majority of the plants are flowering, though they were only planted out of the seed pots about a year ago, and they seem to be far more vigorous than some plants of I. orientalis x chrysographes, which, though of the same age, will not flower this year. This hybrid with I. Wilsoni is distinct and, to my mind, beautiful. The long, hanging fall of deep purple has more gold veining at the throat than even the best forms of I. chrysographes, and the fact that the style-branches are raised high above the falls makes the gold-veined haft of the falls also conspicuous. The colour of the style-branches is a curious dull reddish plum-purple, forming a contrast with the distinctly bluer falls and standards. The standards are narrow and lean outwards, as in I. Wilsoni.

Crosses made with pollen of I. chrysographes used on the typical blue, and on the white, form of I. sibirica have given interesting results, for the hybrids are easily distinguishable from one another. Both are vigorous and grow taller than I. chrysographes, though perhaps not so tall as the tallest sibiricas. In the cross with I. sibirica the blue-purple fall has an ill-defined central region of richer colour, with irregular and inconspicuous white mottlings, which become faintly tinged with yellow at the throat. The style-branches are of the deepest blue-black, and the small standards slope outwards, as in I. chrysographes. On the contrary, the plants raised from the white sibirica have flowers of a rich blue-purple, on the falls of which there is a white central region veined with deep blue-purple. The style-branches are not nearly so dark, and are of a distinctly redder shade of blue, while the standards are large and broad, as in I. sibirica. The flower is slightly larger than the finest sibirica, except those which have arisen from crosses between that species and I. orientalis. There is no trace, even in the offspring of the white form of I. sibirica, of the rich red-purple falls of I. chrysographes, though the colour is apparent in the cross with I. Wilsoni.

The most striking of all the hybrids of I. chrysographes that I have raised came from a cross with a pale buff-coloured form of I. Douglasiana, I. chrysographes being the seed-parent. The plant is intermediate in growth between the two parents, and bears a lateral branch below the terminal head, a character that I have not so far noticed in the seed-parent. The spreading flowers are of a beautiful deep old-rose colour, and the falls bear a conspicuous patch of gold veining.

A curious point about these hybrids is that, although the perianth tube of I. chrysographes is of a dark red-purple, contrasting sharply with the green ovary, all the hybrids have greenish perianth tubes, except the sibirica crosses, in which they are darker than those of I. chrysographes, even though in I. sibirica the tube is green, faintly mottled with purple.

I. chrysographes has a small hollow space in the centre of its stem, about equal in diameter to the thickness of the walls. In the hybrids with I. Wilsoni and I. Forrestii the diameter of the hollow is only slightly increased, in those with I. sibirica the walls are about as thin and the opening is as broad as in that species, while in the cross with I. Douglasiana the influence of the pollen of the latter has been potent enough to close the opening entirely with pith of loose texture.

Iris Clarkei.

(" *The Gardeners' Chronicle*"—*July* 10*th*, 1909.)

An interesting point with regard to this iris has lately been cleared up. As described by Baker in his " *Handbook of the Irideae*," this species possessed both beard and crest, and it was therefore classed in the group of Pseudevansia. Owing to this fact, I thought I was justified in giving in " *The Gardeners' Chronicle*" *for January 2nd and* 16*th*, 1909, a description of what appeared to be a new iris under the name of I. himalaica. However, after seeing the material in the Herbarium at Kew, and suspecting that the only evidence for the crest and beard was Sir Joseph Hooker's sketch at Kew, I recently sent more flowers, with the suggestion that they should be compared with the sketch. The keeper of the Herbarium, Dr. Stapf, now tells me that he has no doubt that the flowers are identical with the subject of the sketch. As it happened, Sir Joseph Hooker himself was at Kew, and, on seeing a flower, remembered collecting the plant for the first time on Tenglo sixty years ago !

The name of I. himalaica cannot therefore stand, and I. Clarkei must be removed from the Pseudevansia group and placed in the Apogon section near I. sibirica and I. Delavayi.

The plant is interesting from the fact that it appears to be in a state of mutation similar to that of the famous plants of Oenothera found by Prof. de Vries. I have already noticed wide differences in the standards and in the foliage. In imported plants the leaves have a curiously polished upper surface, but in seedling plants there is sometimes apparently bud variation, and plants occur with leaves that are distinctly glaucous on both sides, while some of the shoots on the same plants have leaves with the characteristic polished upper surface. In colour, too, there is considerable variation—to a much greater degree than I have found in growing seedlings of other species of iris.

Iris cristata.

(" *The Flower Grower*"—*October*, 1924.)

I was much interested to read Mr. Shreve's article on " Iris cristata," on *p*. 301 of your issue for August. I was, however, much astonished by his statement that the plants cannot be moved in the summer. My experience is that that is the time when it is easiest to move and multiply the plants. Anyone who grows this iris will know that each flowering shoot sends out from its base one, two, three, or even four new shoots which run horizontally for an inch or two and then rise erect. Anyone who will examine these new growths a week or two after the flowering period will find that new white roots are pushing out just at the point where the growth turns erect. My own practice has always been to cut off these growths directly the roots are beginning to push out and replant them at once, and keep them moist for a few days. Then each of these pieces will form a flowering plant by the following year.

I cannot help thinking that even in its native home this iris must behave in much the same way as it does in this country and send out its new growths which begin to root just after flowering time. Obviously it is better to transplant any iris when the roots are just about to push into the ground than when they have grown to some length and must necessarily be broken by transplantation.

One thing that always puzzled me about Iris cristata, was, that although I have on several occasions saved seeds from my plants, I have never yet induced a seed to germinate, and yet I think I am right in saying that it is the only iris of which I have failed to obtain germination of home-saved seeds. If anyone who grows this iris or can collect seeds from wild parts would be good enough to send me a few, especially if he can also give me directions as to how to germinate them, I shall be very grateful.

A white form of this iris has been in cultivation in this country for some years, but so far as I know we have none of the intermediate forms between white and fairly deep blue. A yellow variety sounds improbable, but it would be interesting if it did exist.

Iris Douglasiana.

(" *The Gardeners' Chronicle*"—*August 28th*, 1920.)

Iris Douglasiana is one of the most vigorous and, therefore, the easiest to grow of the Californian group of American irises. It was named in honour of David Douglas, who collected plants in North America in 1823 and 1824, but it was not until about 1870 that it was brought into cultivation in this country. Even now it is not nearly so widely grown as it deserves to be, and yet there is considerable scope for the plant breeder within the wide ranges of colouring which occur in the flowers of this species. Indeed, one of its peculiarities is that hardly any two seedlings bear flowers of precisely the same colouring and marking and, moreover, they may vary from pale cream through mauve to a deep purple.

The reason why this plant is not as widely grown and appreciated as it should be probably lies in the fact that it is impatient of removal or rather does not lend itself to treatment by the rough-and-ready rule that all herbaceous plants may be moved in the autumn. The rhizomes are slender, and, therefore, cannot long survive unless the roots are active. The rhizomes of bearded irises are much stouter and can preserve their vitality throughout the winter even when transplantation has taken place so late in the year that root action does not begin again until the spring. If, however, plants of I. Douglasiana are moved in May, June or July they will soon establish themselves in their new home provided they are kept partially shaded and the soil is kept moist until the roots have been able to push their way into it.

Iris Douglasiana flowers in May, and as the stems branch and as each spathe contains two or three flowers that open in succession, the display lasts for a considerable time. The infinite variety to be found in a bed of seedlings is amazing and renders it very difficult to give any general definition of the flowers. They are almost invariably veined with a darker shade on a lighter or even white ground, but on the blade of the falls the veining usually disappears and the colour becomes uniform.

The foliage of Iris Douglasiana is very characteristic. It is rather thin and wiry in texture with a polished surface and usually tinged with pink at the base. The actual shade of green seems to vary with the intensity of the colouring of the flowers, and the curious dark, brick-red of the old and dying leaves is a colour that probably does not occur in any other species. The leaves remain green throughout the winter and only die away in the spring when the young growths develop rapidly together with the flowering stems.

I. Douglasiana seems to be happiest in a rich, light soil in which there is no great proportion of lime. Seeds should be sown in the early autumn in pots plunged in the open ground and left exposed to the effects of frost and snow. Early in the year the young seedlings will appear, and they then do all the better with the protection of a cold frame. It is important that they should grow rapidly and be planted out where they are to remain as soon as they have made four or six leaves. Then they will have time to make good growth during the summer and to become sturdy and well established plants before the winter. When treated in this way no difficulty will be found in getting them to flower in the following year, and after that each plant will soon develop into a large clump producing annually innumerable spikes of flowers.

Iris filifolia.

(" *The Gardeners' Chronicle* "—*September 23rd*, 1911.)

For some years past an iris has been offered by dealers under the name of I. filifolia. It is a valuable garden plant, for it is about the first member of the Spanish Iris group to flower, and its blooms are large, with blue-purple standards and pale blue falls, set off with a golden central stripe. It grows about twelve or eighteen inches high and increases rapidly in rich, light soil. Like all Spanish Irises it is the better for an annual shift of quarters. This operation may be performed as soon as the foliage turns yellow—about the beginning of August. If it is not carried out, the struggle for existence ensues between the central flowering bulb and the four or six bulblets which cluster round its base, with the result that either the flowering bulb is deprived of some of the nutriment that it would otherwise obtain, or else the bulblets are unable to develop for the following years. In the wild state the latter is the usual result, and the empty husks of bulblets that have been unable to develop are commonly to be found among the withered coats of the old flowering bulbs, in which collected specimens are almost always enclosed.

Anyone who has the patience to wait four or five years for the flowers should cross this iris with pollen of I. lusitanica and the ordinary garden forms of I. xiphium. The result will be a series of varieties of the so-called Dutch Irises that have lately been introduced into commerce. The widely circulated statement that in obtaining these Dutch Irises all the known species of Spanish Irises were combined, seems to be erroneous, for none of them shows any trace of perianth tube, which would almost certainly have appeared sooner or later if either tingitana, Boissieri or juncea had been among the parents. Moreover, the early-flowering habit of the seed-parent explains the precocity of the hybrids, which come into flower in the last week in May—usually a full fortnight before the first of the ordinary Spanish varieties.

How the name of Iris filifolia came to be applied to the iris in question is not apparent, for a reference to Boissier's description in "*Voyage Bot. Esp.*," *p.* 602, *t.* 170 (1839-45), shows clearly that the identification is wrong. Boissier's plant is distinguished at once from xiphium by the presence of a tube equal in length to half the length of the bud, while the filifolia of the trade has no tube, apart from the short funnel that separates the ovary from the base of the segments of the flower.

It is just possible that the confusion may have originated from the fact that both the true and the false filifolia are found in the neighbourhood of Gibraltar. The one may have been collected and re-introduced for the other. Thanks to the kindness of a correspondent, I have, this year, had the true filifolia in flower here, and the half-dozen blooms that I had were enough to show how desirable an iris this is. The stem is about fifteen inches high, and bears one or two flowers of the richest red-purple, the falls being decorated with a broad central golden, oblong patch, surrounded by a blue halo. Thanks to the warm, dry weather, seed set in abundance, and the bulbs also have increased in number. It is to be hoped therefore, that the true Iris filifolia may soon be less rare in our gardens than it appears to be at present.

Curiously enough, I also received early this summer some iris flowers from the neighbourhood of Gibraltar, which, as far as could be seen from their somewhat withered state, were identical with the false filifolia. They are known to local botanists as I. Fontanesii, Godr., a name which, by the way, appears to be based upon a confusion and to have no validity. The name of I. xiphium *var.* praecox would seem to be the most appropriate.

Iris flavescens.

"*The Gardeners' Chronicle*"—*August* 6*th*, 1910.)

Mr. J. G. Baker, in his "*Irideae,*" places Iris sulphurea (Koch) and Iris imbricata, Lindl, under this species, and describes the habitats as Bosnia and the Caucasus and Armenia. It is classed among the tall, bearded irises, and is closely allied to Iris germanica. Like those of many other members of this group, the flowers are sweetly scented; they are produced in May. Of a deeper shade of colour, but not quite so pleasing nor as free in flowering, is the form known as I. flavescens *var.* leucantha. These irises prefer a rather dry and sunny position, and good, loamy, but not freshly manured soil.

Iris x fulvala.

(" *The Gardeners' Chronicle*"—*July 2nd*, 1910.)

This iris, which was shown before the Royal Horticultural Society on June 21st, and recommended for an Award of Merit by the Floral Committee, is interesting as being the first recorded hybrid of Iris fulva, a species from the swamps of the Southern United States distinguished by its remarkable terra-cotta colour and the drooping habit of its standards and falls. The fact that no other iris approaches it in colour has led to repeated attempts to increase the size of the flower by hybridisation, but, hitherto, apparently, these attempts have been fruitless.

The pollen parent of fulvala was the beautiful local species found by Lora La Mance in the mountains of Arkansas and usually known as hexagona Lamancei. This iris forms, with the true hexagona, one of the several curious pairs of American irises (of which another instance is bracteata and Purdyi), the flowers of which can scarcely be distinguished, although the structural details of the botanically important parts of the plants, such as the ovary, the tube and the spathes, show that they belong to two distinct species. The large blue-purple, flattish flowers of Lamancei are of considerable substance and great beauty, but the plant produces only a dwarf stem, and, therefore, hides its flowers low down among the leaves.

In the hybrid the tall stem of fulva is retained, and three to five flowers are borne in the axils of large leaves which decrease in size from the base upwards. The flower is of the shape of Lamancei, with spreading segments and somewhat pointed falls. The colour of the specimens shown at the meeting was a rich velvety, reddish- almost crimson-purple, becoming yellow towards the centre of the flower, the falls bearing a central, deep yellow, slightly raised ridge, which is distinctly pubescent. This last feature is noticeable in Lamancei but not in fulva.

As far as I can tell at present the plant is more floriferous than fulva, which, in some years, fails to give me any flowers at all.

Besides the above plant, I have another which is very similar, but which bears flowers of a deep blue-violet. Both come from a pod of seed that ripened in 1907.

Iris Grant-Duffii and its allies.

(*" The Gardeners' Chronicle "—May 8th,* 1909.)

Will any reader of *" The Gardeners' Chronicle,"* who has succeeded in inducing I. Grant-Duffii to flower give his experience? It was one of the very few irises that baffled the late Sir Michael Foster. I remember his telling me, as he gave me some roots, that he had grown them for twenty-five years from the time that General Grant Duff gave them to him, and that he had never had a flower. These plants I still have, and others imported from Palestine, but I have never yet seen a flower.

I. Aschersonii, however, is flowering freely this year with me, and I attribute this to the fact that I am growing it in moist, rich soil. I. Grant-Duffii, too, seems to be doing better under these conditions, and I hope to see flowers next year. A correspondent in Jaffa told me that these irises grow in swamps, which means, I take it, that the soil is moist in spring and yet parched in the height of summer. I. ochroleuca and I. Monnieri are found wild, I believe, in similar situations, and need moisture and rich feeding to flower well. It remains to be seen whether I. Grant-Duffii will respond to this treatment, or whether the secret of its needs has yet to be discovered.

The new Iris melanosticta is said to be a member of the same group, and a purple-flowered form, I. masia, is also in cultivation.

An Autumn-flowering Iris.

(GÜLDENSTADTIANA.)

(*"The Gardeners' Chronicle"—October 26th,* 1918.)

The sketch reproduced in *fig.* 63 is of an iris which does not get much attention or praise when it flowers in June, for then it is overshadowed by finer forms of the Spuria section. When, however, it sends up its second show of spikes in mid-September, and when each spike has as many as three or four flowers open at once, it is a much more valuable plant.

Its real name is exceedingly hard, or indeed impossible, to discover, for it is one of a numerous company of Asiatic relatives of I. spuria, which seem to abound in every brackish marsh from Smyrna to Srinagar. The oldest name appears to be Pallas' halophila, "salt-loving," and others are Güldenstadtiana, sogdiana, and desertorum. It is difficult, if not impossible, to distinguish herbarium specimens of the various local forms, and further confusion has been caused by the fact that all seed exceedingly freely. The seeds germinate readily and the plants grow vigorously and easily oust any more delicate species near which they happen to have sprung up. Anyone who attempts to obtain a collection of iris species by raising plants from the seeds offered by botanic gardens and continental seedsmen will find that a large proportion of the most attractive names have been attached to seeds of some form of this iris.

The individual flowers are not large, for the blade of the fall is only about three-quarters of an inch in width, the whole flower measuring about three inches across. The colours vary, but usually consist of more or less faint purple veins on a pale mauve or cream ground, with a central yellow mark on the blade of the falls. One curious form which was sent to me as sogdiana by Mme. Fedtschenko has flowers of a peculiar shade of mauve-purple, which could only be matched among the pallidas, if, indeed, the exact tone ever comes even then.

The seeds of this iris are curious, and well adapted to the marshy habitat in which it grows in the wild state. For each is enveloped in a loose, but air-tight, parchment-like covering, which enables it to float in water. On the surface it is either carried along by any current or blown by the wind until it strands on some bank, where it has more chance of germinating and growing into a plant than if it lacked this covering and sank to the bottom of the water, where the young plant would probably be drowned, even if the seed succeeded in germinating at all.

IRIS ROSENBACHIANA.

There seems to be no doubt that, as was suggested in an article in these columns some months ago, two distinct species are really concealed under the name of Iris Rosenbachiana. It was suggested that the two species could be separated by certain characteristics, visible in the dry bulbs, and the sketch reproduced in "*The Gardeners' Chronicle*," *October 26th*, 1918, *fig.* 64, is an attempt to show bulbs of the two species. That on the right is slightly larger; the fleshy roots taper gradually and their colour is a light brown. On the contrary, the bulb on the left has roots which taper more abruptly, and they are always whiter in colour. It seems probable that the bulb on the right is that of the true I. Rosenbachiana. It flowers a fortnight to a month earlier than the other species when the bulbs are grown together under the same conditions. So far as my experience goes, the flowers of this early-flowering species are always white, with crimson or reddish-purple markings and a conspicuous golden crest, whereas those of the other species are very various in colour, usually of some shade of blue or red-purple, but occasionally even of a pale yellow with faint purple veins. There is one difference in the flowers which seems to be constant, and that is that the pollen of the early-flowering form is always yellow, while that of the other is always white.

In her account of the irises of Turkestan in the "*Journal Russe de Botanique*," 1909, *No.* 5, *p.* 77, Mme. Fedtschenko says of I. Rosenbachiana: "Flowers large, of various and beautiful colour," and of I. baldshuanica: "Flowers smaller, yellow." This is barely a satisfactory diagnosis of the two species, and it is probable that some of the plants which she took to be Rosenbachiana should really be classified as specimens of baldshuanica. It is not yet certain whether these two plants breed true when raised from seed, and it is therefore impossible to say at present whether we must consider them as two good and distinct species or merely as local forms of the same species. In the meanwhile it may be useful, at any rate for gardening purposes, to say that I. baldshuanica differs from I. Rosenbachiana in being slightly smaller and flowering later, in having white and not yellow pollen, and in having fleshy roots to the bulbs, which taper abruptly and not gradually.

Both these irises are easy to raise from seed, which should be sown in the late summer or early autumn. By the end of the first year the small bulbs will have no persistent rootlets. If the soil in the seed-pots is made sufficiently rich, the small bulbs may be left in them until the end of their second year, when they will be found to have developed a root almost as large as, and in some cases even larger than, themselves. At the end of the second year the small bulbs should be planted out in a sheltered sunny corner, or preferably in a cold frame. A year, or at most two years, later the bulbs will begin to flower and, although in most cases propagation by offsets from bulbs is slow, it will be found that some individuals seem to increase fairly rapidly by this means. A strong bulb is capable of throwing up three or even four flowers in succession, so that the display lasts for a considerable time.

Iris himalaica.

(" *The Gardeners' Chronicle*"—*January 2nd*, 1909.)

May I suggest the above as a name for a species of iris, hitherto, I believe, undescribed, which was sent to me from a locality within sight of Darjeeling in February, 1907? In the case of these plants the colour of the flower was a deep violet-blue, and I find that Mr. T. Smith, of Newry, grows a sky-blue form under the name of I. Clarkei and a purple variety under that of I. decora, both having been raised from seed received from the Himalayas. The true I. Clarkei and I. decora are, of course, quite distinct.

This iris has been thought by some to be a form of I. sibirica, but in reality it is far more closely related to the Chinese I. Delavayi than to any form of I. sibirica with which I am acquainted. Its falls are always blotched like those of I. Delavayi and not veined as in the case of I. sibirica, and the capsule and seeds closely resemble those of the former. It differs, however, from I. Delavayi and I. sibirica in having a solid stem at all stages of its growth, while the drooping leaves are also very characteristic, having a curiously smooth and polished upper surface, which contrasts strongly with the slightly glaucous under-surface.

My plants came into flower this year about the middle of June, having grown well under fairly moist conditions in a soil rich in humus. The blooms have the drooping appearance so characteristic of the Himalayan irises, such as Duthiei, kumaonensis, etc., and the style branches rise above the tips of the spreading standards. The markings of the falls consist of white blotches on a violet-blue ground, and the throat is tinged with yellow. There is no trace of either crest or beard, so that the plant belongs to the Apogon section and has nothing to do with I. Clarkei, the name under which it was sent from Darjeeling.

The following is a more detailed description :—I. himalaica, rhizome slender, wide-creeping ; sheaths splitting into fine fibres. Leaves linear, moderately firm at first, but drooping when full grown, upper surface smooth and polished, under surface finely ribbed and slightly glaucous, two to three feet long, three-quarters of an inch broad. Stem slender, lozenge-shaped rather than round in section, solid, two feet high, overtopping the leaves, branched, bearing three heads of flowers. Spathes two-flowered, valves yellowish-green, three inches long ; pedicels three inches long. Perianth tube triangular, half an inch long ; standards spreading, lanceolate, with deeply-channelled limb, one and a half inches long and three-quarters of an inch broad, violet-blue veined with a deeper shade ; falls two inches long by one inch broad, obovate-cuneate, violet-blue blotched with white and yellow at the throat. Style-branches very broad, keeled and conspicuous, one and a half inches long ; crests small, overlapping. Capsule two inches long, oblong, trigonous ; seeds flat, circular, with dark centre and pale margin.

Iris Hoogiana (Sp. Nova*).

(" *The Gardeners' Chronicle* "—*November 4th*, 1916.)

In the autumn of 1913 I received from the firm of Van Tubergen a number of shrivelled rhizomes of an iris which had been collected in Turkestan. The growth made in 1914 and 1915 confirmed my first impression that the iris belonged to the Regelia section, but it was not until this summer that the first flowers appeared, and showed at once that another magnificent iris has been added to the already long list of good garden plants that have been introduced from Turkestan. It is with considerable pleasure that I dedicate this new species to the brothers Hoog, who now, I believe, since the retirement of their uncle, Mr. C. G. Van Tubergen, junr., constitute the well-known Haarlem firm, and who, the one by his enterprise in introducing plants from foreign countries and the other by his skill as a hybridiser, have made so many valuable additions to the contents of our gardens.

Iris Hoogiana is remarkable for the fact that the flowers, unlike those of the other known members of the Regelia section, are of a uniform pale lavender set off by the brilliant orange beard of closely set hairs, which is broad along the haft but narrows to a sharp point on the blade. A beard also grows strongly up the inner side of the haft of the standards, a feature which is characteristic of the section. The exact shade of the lavender colour varies a little, I think, in individual plants, and Mr. Hoog tells me that a few of his produced pure white flowers. I noticed among my plants that the vast majority have their leaves strongly tinged with purple at the base, and this was certainly the case with all those that flowered. In some few the base of the leaves was green, and it will be no surprise if these produce white flowers.

During this recent summer I became convinced that it has been my own fault that I have had comparatively few flowers on my Regelia Irises, though the plants have increased considerably. For some years I have been in the habit of lifting the plants in June almost immediately after the flowers had faded. I did this owing to my anxiety to get the rhizomes out of the ground before the long root fibres had thrown out those lateral growths which anchor them into the ground and which, when once disturbed, never take hold of the soil again. I had more than once been disappointed to find, when the time to replant arrived early in October, that the roots of my plants had withered to a large extent instead of remaining plump and firm, as were those on rhizomes that I received from Haarlem. This year I determined to wait longer before uprooting the plants, and was rewarded when I finally took them up in the middle of July by finding that the main root-fibres were much stouter and more mature than usual, and that the lateral rootlets had only developed in a very few cases.

The foliage of I. Hoogiana is very similar to that of I. Korolkowi and I. stolonifera. The leaves grow about fifteen or eighteen inches long by about three-quarters of an inch in breadth and are of a slightly glaucous green. The stem is about twenty inches in height, and bears a single head of two or three flowers. The sharply-keeled green spathes are from three to three and a half inches long by nearly three-quarters of an inch broad, and are slightly flushed with purple and membranous in the upper third. The pedicel is short, the ovary nearly an inch long, and the perianth tube slightly over an inch in length and striped with dark purple. The falls are three inches long by nearly one and a quarter inches broad, the blade not being separated by any constriction from the broad, strap-shaped haft. The bright orange-yellow beard is not confined to the haft as in I. Korolkowi, but comes well on to the blade, where it ends in a sharp point. The standards are of the same uniform colour as the falls and grow gradually broader from the haft to a point near the apex. The haft is strongly bearded on the inner side. The style branches are of the same colour as the rest of the flower, the crests triangular and erect. The stigma is entire, the anthers are long, of the same colour as the filaments and the rest of the flower. The pollen is cream-coloured, and the seeds are of the usual Regelia and Oncocyclus type, namely, brown, wrinkled and pyriform with a conspicuous, large, cream-coloured aril. The capsule is long and narrow, with a tapering apex, and it dehisces below the apex as do those of the other Regelia Irises. The rhizomatous root-stock spreads rapidly by stolons which run freely in all directions, the new shoots often appearing at a distance of several inches from the parent growth. This feature is more marked in I. Hoogiana than in I. Korolkowi, but it is, I think, impossible to separate its rhizomes from those of I. stolonifera, when in a dormant condition.

My experience of three years' cultivation of this fine new species shows that it is exceptionally vigorous, even for a Regelia Iris, and it is not improbable that the comparatively pale uniform colour of its flowers will combine in hybrids to give us results more pleasing than those which have so far resulted from crosses of the Regelia species. I am alluding, of course, not to the Regelio-cyclus hybrids, which stand apart by themselves, but to the few crosses which appear to have been successful between Regelia Irises and various Pogoniris. In these the colour is always either lurid or dingy, a result which is doubtless due to the presence of the numerous colour factors which go to make up the beauty of such species as Korolkowii and stolonifera.

I. Hoogiana seems to be one of the very few species of iris which can only be distinguished from its relatives by the colour of its flowers. As a general rule, colour has little value as a guide to specific rank among irises, but in this case the absence of conspicuous veining and the uniform tone of the whole flower seem amply sufficient to separate this iris from its nearest relatives, I. Korolkowi and I. stolonifera.

* *Iris Hoogiana a sectione Regelia Iridibus Korolkowii et stoloniferae valde affinis sed floribus concoloribus aut lilacinis aut albis nec venosis facile distinguitur.*

Iris Hoogiana.

(" *The Gardeners' Chronicle*"—*June 7th*, 1919.)

This recent introduction was discovered, I believe, in Turkestan in 1913 by a collector working on behalf of the firm of Van Tubergen, of Haarlem, and is, to my mind, by far the best addition that has been made for many years to the known species of the genus. It is obviously a member of the Regelia section, and therefore closely allied to I. Korolkowi and I. stolonifera, though it is curious to find a species with flowers of such pure colour in a section which is otherwise remarkable for the veining and contrasting colours of its flowers. The rhizome, with its slender, running stolons, is characteristic of a Regelia Iris, and, if it differs at all from those of the other species, the difference lies chiefly in the fact that it remains dormant in spring until several weeks after the shoots of the other species have appeared above the surface. Then, however, it grows so fast that, with the exception of the rare I. Suwarowi, which is seldom seen in cultivation, it is the first Regelia Iris to come into flower, though its stems grow nearly three feet in height and thus overtop the others.

Each stem bears either two or sometimes three flowers, which open in succession. The colour is apt to vary a little in each individual plant. In some it is the very faint blue of the sky on a sunny summer day, but in others it is many shades darker,and sometimes there is a distinct tinge of reddish-purple. Perhaps it may help to say that the colour varies as it does in Iris pallida. The pale colour of I. pallida dalmatica is approximately that of the palest I. Hoogiana, though I can hardly say that any I. Hoogiana has yet appeared with flowers as dark as those of my darkest pallida seedlings. As we might have expected, a white form appeared among the collected plants, so Mr. Hoog tells me, though it is weaker than the purple-flowered forms. No example of it was, unfortunately, among those that I received, and I have not yet seen a flower. Of white pallidas I have now at least three seedling forms, even if I have lost, as I am afraid may be the case, the piece of the wild white pallida of which I found a flowering plant on the hills near Ragusa on the Dalmatian coast.

The beard of I. Hoogiana is remarkably thick behind, and then narrows gradually to a sharp point in front on the blade of the fall. It consists of closely-set golden hairs, which in the darker forms are sometimes slightly tipped with a colour so dark as to be almost brown. The standards are strongly bearded on the inner side.

This iris was originally described in "*The Gardeners' Chronicle,*" *November 4th,* 1916, *p.* 216, as closely allied to I. Korolkowi and I. stolonifera, and this is undoubtedly the case. Its rhizome is that of the latter, and not that of I. Korolkowi, which is more compact, but I am inclined to think that herbarium specimens of I. stolonifera and I. Hoogiana in which the flowers were badly crushed and had lost their colour, would be indistinguishable. This is one of the few cases, apart from the Oncocyclus group, in which two closely-allied species of iris cannot be readily distinguished by some structural feature. Of course, we may take the absence of veining in the flowers as a structural difference, and this is certainly remarkable, but only, I think, at first sight, for on closer inspection it will be seen that the veins are there but so faint as to be practically invisible. One of the features of I. stolonifera is the way in which the blue colour is suffused over the brown-purple ground. In I. Hoogiana in some cases there is a delightful suffusion of opalescent tints of green and brighter blue over the central portion of the falls and on the outer side of the standards.

Yet in spite of the close resemblance—apart from colour—between the two species, I am quite convinced that I. Hoogiana is a good and distinct species, for which there should be a great future in store, if only those who grow it will take up their plants about the middle of July and replant them early in October. For years I have been in the habit of taking up Regelia Irises early in June, but now I am sure that the new growths were not then mature. Consequently they did not flower well in the following season. Now, however, that I leave my plants untouched till July, I am rewarded with crowded flower stems. Last year I was pleased when I counted thirty-six stems of I. Hoogiana, but this year there are over two hundred, and these have come from a small patch of collected rhizomes which filled in 1914 about one square yard of a bed. Now I am overrun with I. Hoogiana, and have no hesitation in recommending it not only as one of the most striking of all iris species, but also as one with an excellent constitution.

Two New Irises.

I. HOOGIANA. I. TURKOMAN.

(" *The Garden* "—*June 7th*, 1919.)

Iris Hoogiana was a great disappointment to me when I saw it in the tent at Chelsea on the afternoon of May 20th. Here in the sunshine of the garden it is a magnificent iris, indeed, I am inclined to think it is one of the most beautiful of all. In the open daylight, the colour is a pale, or slightly darker blue, but under canvas the yellowish light made the flowers look almost mauve. Some of the most beautiful of all the forms have a trace of green up the centre of the back of the standards and near the end of the beard on the falls, and in those cases, the blue of the whole flower is almost the colour of the sky on these bright days. This iris was collected for Mr. C. G. Van Tubergen of Haarlem in Turkestan in 1913, and is the strongest grower of all the Regelia Irises. I received a number of small pieces of shrivelled rhizome, which occupied perhaps two square feet or three square feet when planted in a bed. This year the plants that I have grown from them fill a bed containing about two hundred square feet, and the flower spikes number over two hundred. It was a pleasure to me to be able to name this fine species after Mr. John Hoog and his brother, who now, since their uncle's death, constitute the firm of Van Tubergen. They have done so much to fill our gardens with new species of iris and tulip and to give us hybrids of them, that it was only fitting that their name should be commemorated in this way.

It is surprising to find a species of Regelia Iris with flowers so uniform in colour as those of Hoogiana, when all the others are remarkable for the veining, which covers all the segments. Korolkowi, stolonifera and Suwarowi are probably the only species now in cultivation, but all are conspicuous for their veining. Mr. Hoog tells me that there is a white form of Hoogiana which is rather more delicate than the type, but I am sorry to say it has not appeared among my plants. I. Hoogiana grows to a height of two feet six inches or three feet and each stem produces two or three flowers. It agrees with the other Regelia Irises in having its standards strongly bearded on the inner side. On the falls, the beard is very broad and close behind, but narrows to a sharp point in front.

IRIS TURKOMAN (KOROLKOWI x STOLONIFERA).

This is an interesting hybrid between two Turkestan species in which the blue beard of stolonifera has combined with the dark beard of Korolkowi to form the conspicuous beard of blue that is electric. The shape of the flower is that of Korolkowi, rather than that of stolonifera. The colour of the flower is difficult to describe, but results from the combination of brown and blue-purple. The greyish-white ground is almost wholly obscured, except at the edges of the lower part of both standards and falls, by diffused veins of brown, which become more and more blue as they approach the centre of the fall or standards. This hybrid is a good grower and flowers freely. My patch of it covers a square yard and has over sixty stems. There are other hybrids from the same cross, one of which has a dark brown beard instead of the blue of Turkoman, while another has a beard of even deeper blue, and is more richly coloured, but it is a younger brother and has yet to grow up before it can be introduced to the public.

The Juno Irises.

(*" The Gardeners' Chronicle "—December 17th,* 1910.)

The name Juno was applied to a certain section of the Iris family, apparently for no better reason than that in ancient mythology Iris, the messenger from gods to men, was sometimes represented as being more particularly attached to Juno than to the other deities. The application was scarcely apt, for Iris was in any case subordinate to Juno, and the names are now used in opposite relation. However, this may be, the name Juno stands for a very clearly marked section of bulbous irises, distinguished by the fact that the bulb in its resting state has attached to its base a number of tapering, fleshy roots, which quickly send out branching rootlets when growth begins again in the autumn. The leaves too, are unlike those of any other irises, and in the larger species at any rate, closely resemble those of the Maize

(Zea Mays). The flowers are produced from the axils of the leaves, and may be either solitary in the smaller species or as many as eight or nine in number in well-grown plants of I. bucharica or I. Willmottiana. The Juno Irises are also remarkable in that they are the only species which have spherical pollen grains. Another peculiarity of the group is that the inner perianth segments, which in other species are commonly and conveniently known as standards, are here much reduced in size, so as to be far shorter and narrower than the falls. Moreover, they usually extend horizontally, and are even in some cases depressed and droop down to touch the perianth tube. In fact the words " fall " and " standard " are singularly inappropriate to the outer and inner segments of these irises.

Hitherto, it has been usual, apparently, to make no subdivision in this section, but increasing familiarity with the plants has shown that there are at least two well-marked divisions comprised within it. It is characteristic of many species of this group that the haft of the fall bears large projecting wings—hence the name of the well-known species, alata—which tend to curl over and meet above the branches of the style. Moreover, it is a curious fact that all the known species which possess these winged falls have also globular seeds, while all those of which the sides of the falls are parallel have seeds of distinct types. The majority of them are roughly cubical, the minority comprise only the rare species Rosenbachiana, and drepanophylla, and possibly another species, as yet unpublished, from Bokhara.

The first group, those with winged falls and globular seeds, comprises the following species :—Willmottiana, fumosa, and Stocksii. Even among these there is a well-marked line dividing off from the rest the two winter-flowering species, namely :—alata and palaestina. In both (and to some extent also in persica, which is the next to flower in order of time), the ovary remains for protection below the ground level until it is nearly ripe and the flowers are raised on long perianth tubes. Another peculiarity of these two irises is that they—and they alone of all the species at present in cultivation—have pollen grains that are covered with minute spines. It has been suggested that these spines may afford some protection against moisture in the atmosphere, which would not penetrate among the close-lying points unless it were present in very large quantities. All iris pollen grains swell up and burst at once if immersed in water, and it may be that the provision of spines on the pollen grains has enabled this species to propagate their kind, even in winter months. The other main sub-group, consisting of plants with strap-shaped falls, comprises orchioides, bucharica, Warleyensis, Fosteriana, which all have cubical seed, and Rosenbachiana, of which the seeds have a conspicuous cream-coloured seam or rhaphe extending all down one side from top to bottom, and are consequently readily distinguishable from those of any other known iris, unless it be drepanophylla, which is only imperfectly known from dried specimens. It might be thought that the flat sides of this group were produced by pressure of the grains against each other in the capsule, but the experience of several years has shown that even when only a few seeds ripen in the capsule, they are still compressed with flattened sides, while seeds of the species of the other group never become flattened, however closely crowded they may be.

The home of the Juno Irises is a comparatively narrow belt of country stretching from the western shores of the Mediterranean to the Punjab in the east. Alata is found in Spain, especially in the neighbourhood of Cordova, where its time of flowering varies with the elevation and in Algeria and in Sicily. where it is abundant near streams on the slopes of Etna. Palestina, a near relative, is a native of Syria, while persica, in eastern Asia Minor and North Persia, has many local colour varieties, of which stenophylla and Tauri are best known. The home of caucasica is sufficiently indicated by its name, and so is that of sindjarensis, if one happens to remember that Sindjar is a mountain in Mesopotamia. Bokhara is the home of a number of the more recently introduced species, while Stocksii and Fosteriana are found further east in Afghanistan, and, lastly, Aitchisonii occurs in the Salt Hills of the Punjab.

As regards cultivation, the Juno Irises cannot be said to be difficult, provided that they are given a sunny, well-drained position. It is curious that the species that has probably been longest in cultivation in England, namely, persica, should be on the whole the least easy of the group, but the explanation probably lies in the fact that it seems to prefer a good stiff loam to a very sandy soil. Unfortunately, it is almost impossible to lift these bulbs, with their lightly attached, fleshy roots, intact, from a heavy soil that cakes hard in summer. Consequently, the bulbs of I. persica supplied by the trade are usually without their roots. They make a feeble attempt, perhaps, to flower in their first season, but fail to form a good bulb for the following year. When once established therefore they are best left alone, or very carefully lifted when they have become too crowded.

The larger species seem less fastidious in their demand for heavy soil, and thrive amazingly in a well-drained bed, well enriched with old leaf soil and manure. Flowering as they do in the early months of the year, they are a most welcome addition to our hardy bulbs, and if the bed cannot be placed in a sheltered corner a temporary frame will preserve the flowers from the weather. Each plant of the taller species, such as bucharica, will remain in flower for two or three weeks, since the blooms open in succession from the top of the stem downwards.

There is a delightful range of colours in the flowers of these irises. Alata is usually a deep blue, with a central orange-coloured ridge, though pure white examples are known. Palestina varies from deep blue, through pale blue and bluish-green to a distinctly yellow-green. Persica is a wonderful combination of white, sea-green and brown-purple set off with a central streak of orange. Of its varieties stenophylla has large flowers of grey-blue, blotched with indigo, and Tauri is mainly red-purple striped with gold. Golden yellow is supplied by orchioides, while bucharica has flowers of a milk-white colour, tipped with brilliant yellow on the blades of the falls. Fosteriana is distinguished by the olive-green coats of its bulbs, and by the contrast of its yellow falls with its dull purple standards. Perhaps the most brilliantly-coloured of all is Rosenbachiana, of which no two seedlings appear to be alike. The prevailing colours are red-purple, white and gold, but of late years some forms have been imported that have primrose-yellow flowers, slightly veined with purple. These are said to come from a locality that rejoices in the name of Tabidara Bolo, but repeated enquiries and searches of maps have failed to establish the whereabouts of this place, beyond the fact that it is somewhere in Central Asia. Anyone who has once grown Rosenbachiana and seen the gaudy flowers develop at an amazing pace in a few sunny days in March will never wish to be without it again, and it is much to be hoped that it will not remain as rare and expensive as it unfortunately is at present. Seed is freely produced in some years, and a single capsule has been known to contain between eighty and ninety seeds, but the process of raising flowering bulbs from seed is somewhat tedious and slow, and takes at least four or five years from the time the seedlings appear, which is sometimes two or three years after the seeds are sown.

The Juno Section.

(" *The Garden* "—*June* 1*st*, 1918.)

The Juno Irises form a very distinct section of the genus, their characteristics being the broad channelled leaves, not unlike those of the maize, and the curious fleshy roots that are attached to the bulb in its resting state. Another feature is to be found in the fact that the inner perianth segments, which in other irises are held erect and therefore called " standards," either stand out horizontally or hang vertically downwards. One species, I. alata, is found near the shores of the Western Mediterranean, while the others are confined to Asia Minor, Mesopotamia and the districts of Central Asia in and around Turkestan. There are at least three, and possibly more, groups of species within the section, which differ in their seeds and in the shape of the falls or outer perianth segments of the flowers.

The most numerous and most widely distributed of these groups is that of which I. alata is typical. The name alata, or winged, was given to this iris because the haft of the falls bears large wings which arch over and clasp the style branch above it. The seeds are spherical, and the plant will rarely succeed except in heavy loam. It is, however, valuable for its habit of flowering in the late autumn, though for this very reason it rarely becomes established, being unable properly to complete and ripen its growth in the depths of winter and in early spring in our climate. The flowers are large for the size of the plant, and usually of a rich blue colour, though an albino form sometimes occurs. In Syria this iris is represented by the slightly smaller I. palestina, of which the flowers vary from blue to greenish-yellow. It needs a microscope to separate this species botanically from alata, for the only difference is to be found in the spherical knobs that top the minute hair-like processes along the haft of the falls.

In Asia Minor there are a number of species known as forms of I. persica. The type is very beautiful with flowers of a kind of opalescent blue and brown-purple. Stenophylla or Heldreichi has flowers of two shades of blue-purple, while those of Tauri are red-purple with golden markings.

All these irises are difficult to establish, because they will only succeed in heavy, tenacious soil, from which it is almost impossible to extract the bulbs with the fragile store roots intact. However, those that do establish themselves live on and flower from year to year in a sheltered, sunny and well-drained corner.

Further north there grows I. caucasica, with flowers of a somewhat transparent yellow, and further east, in the hills of Northern Mesopotamia, the large and beautiful I. sindjarensis with pale blue flowers.

Several hybrids have been raised between these species, which have more vigour than their parents and which do well in good loam. The best is I. sind-pers with flowers of a beautiful blue approaching that of a turquoise, set off by the central golden ridge, which it inherits from I. persica.

I. Willmottiana from Turkestan belongs to this group, as also does I. Tubergeniana. The former has beautiful flowers of blue-purple and white and very broad, glossy foliage, and the latter is one of the few bulbous irises that can boast of a beard. It has yellow flowers.

Some years of experience of the cultivation of these irises has shown that they have no vigour in light soil, and those gardeners who cannot give them loam must try to content themselves with the second group, which is confined to Turkestan and which is distinguished from the former by the wingless falls and by the cubical and not spherical seeds.

The finest member of the group is the white and yellow bucharica, which produces as many as seven or eight flowers, one above the other, in the axils of the leaves, and of which a large bed is a fine sight in April. Wholly yellow forms may be obtained by crossing it with orchioides, which has smaller flowers of a deep yellow, though there is a pale yellow form, sulphurea, and a white form with green veinings. Very beautiful and delicate pale lemon forms of bucharica can also be obtained among seedlings, and it is also possible to introduce into hybrids a certain amount of the purple from the richly-coloured warleyensis. This has flowers of a rich purple, with a golden central ridge in its typical form, but seedlings have given me yellow, or even white. The so-called orchioides coerulea, is, I believe, a hybrid, because it has hitherto always failed to set seeds, though growing under the same conditions as the other plants, of which practically every flower gives rise to a capsule of seeds.

I. Fosteriana from the borders of Afghanistan is an extraordinary plant with an olive green bulb, and flowers of which the outer segments are yellow and the inner a rich purple. Unfortunately, it does not appear to be easy to grow and though I have succeeded in raising seedlings of it, I have never yet contrived to nurse them on to flowering strength.

The Japanese Iris.

(" *The Garden*"—*January* 12*th*, 1913.)

May I enter a protest against the note on " The Japanese Iris," on *p*. 337 of last week's issue ? Iris laevigata is a totally distinct species from I. Kaempferi, from which all the so-called Japanese hybrids have arisen. Both species grow, apparently in proximity, in the Amur district of Manchuria, but they are easily differentiated by the fact that the leaves of I. Kaempferi have a distinct mid-rib, while those of I. laevigata are smooth. The capsules and seeds also are very different. I. laevigata is still a very rare plant although a quasi-albino form of it has long been known under the name of I. albo-purpurea. The typical plant has an unbranched stem, and a head of three or four flowers which open in succession. The colour is an intense blue-purple, and in its best forms this iris is, to my mind, the best of all blue-flowered irises. I have this year had a number of seedling plants in flower, which showed very little variation except in the exact shade of blue. Colour alone cannot, of course, be relied upon as a specific character, but so far as I have been able to discover, wild I. Kaempferi is always of a red-purple colour.

Iris laevigata and Iris Kaempferi.

(" *The Gardeners' Chronicle*"—*July* 9*th*, 1910.)

May I once more revert to this subject, the interest in which is renewed by the recent exhibition of a variety of the so-called albo-purpurea ?

As far as I have been able to discover, the truth of the matter seems to be that in the marshy ground on the banks of the River Amur there grow two irises, one with somewhat narrow leaves, with a distinct mid-rib—to use a convenient, but inaccurate term—and the other with much broader yellow-green leaves, which have a very slight (if any) trace of thickening along the centre. Of these, the former is apparently the I. Kaempferi of Siebold, and the latter the I. laevigata of Fischer and Meyer, but not of Regel. (The latter is a synonym of Iris Kaempferi.) I. Kaempferi has deep red-purple flowers, relieved by a golden central ridge on the falls, whilst I. laevigata is the best blue iris that I have ever seen. I incline to think that these two irises are the parents of the Kaempferi hybrids, so extensively grown in Japan.

Of I. laevigata there are certain garden forms, apparently from Japan, of which the first to be noticed in England was Mr. Baker's albo-purpurea, a plant with white falls dotted with pale blue. The plant which Messrs. R. Wallace & Co. exhibited on June 21st (*see " The Gardeners' Chronicle," vol. xlvii., p.* 231) was a deep-blue form of this, and I am sorry to say that at least two double monstrosities are also to be obtained from Japan, one with six fall-like petals of a deep indigo-blue colour, and the other of a dingy grey colour of similar shape. All of these are, however, vastly inferior, to my mind, to the type, with its large flowers of a glorious deep-blue colour. Both this and Kaempferi are now in flower together here, and I am inclined to wonder whether the Japanese really prefer their double monstrosities, or whether they simply palm off such freaks on us and keep the type to themselves. At any rate, the type seems extremely difficult to obtain, although I hope, in a year or two, to be in a position to distribute some of the many seedlings, both of the type, and of the beautiful form of albo-purpurea that are growing here.

If my view is adopted the proper nomenclature will be :—I. laevigata, Regel, a deep blue single flower ; I. laevigata, Rgl., *var.* albo-purpurea Baker, for the original Kew plant, which is still growing by the side of the new water-lily tank there ; and I. laevigata, Rgl., *var* albo-purpurea Colchesterensis, for the plant that Messrs. R. Wallace & Co. showed. In view of the length of this latter title, it would surely be better to give some English name to this garden form, especially as it seems more convenient to reserve Latin names for wild species.

Iris laevigata, Fischer.

(*" The Gardeners' Chronicle "—June 5th,* 1920.)

This fine iris has only come into cultivation in this country in comparatively recent years, but, now that it is at last available, no bog or water garden should be without it, for the blue-purple of its flowers is of a shade that occurs in no other iris. The plant is of easy growth and flourishes in rich, light soil where the water supply in summer is abundant.

That I. laevigata is not well-known is partly due to the fact that the botanists have long confused it with I. Kaempferi, from which, however, it is entirely distinct. The most obvious point of difference in the growing plants lies in the leaves. Those of I. laevigata are smooth and broad, while those of I. Kaempferi are comparatively narrow and have also a very conspicuous raised mid-rib. Moreover, the capsules and seeds of the two species are very dissimilar, the seeds of I. laevigata being large, flattened and smooth, very like those of our native I. pseudacorus.

Difference of colour in the flower is, of course, no certain indication of specific difference in plants, but, however, the wild I. Kaempferi always apparently bears red-purple flowers, while those of I. laevigata are always blue-purple. The whole flower is of the same shade of colour, except for a narrow streak of pale-greenish yellow that runs along the haft of the falls and out on to the blade. There is also in cultivation a pure white form, while another, in which the falls are blotched with blue-purple on a white ground, was described in "*The Botanical Magazine*," *t.* 7.511, as a species, so long ago as 1896. This last form probably arose in cultivation in Japan, where there is also grown a monstrosity with double flowers. A curious fact is that the albo-purpurea form comes true from seed, in so far as all the seedlings bear flowers mottled with blue-purple on a white ground, although the amount of mottling and the shade of the purple colour vary considerably.

The confusion between I. laevigata and I. Kaempferi probably arose because the two species both come from the same districts. They are found in swampy places near Lake Baikal and from there eastwards through Manchuria and Northern China. They also occur in Corea and probably also in Japan, though it is a little difficult to feel certain that they are really wild in the latter country. I. laevigata was first discovered by Pallas in his journey through certain provinces of the Russian Empire about 1770. His specimen is now in the Herbarium of the Linnaean Society at Burlington House and was collected in the swamps near Lake Baikal. In 1829 Turczaninow found the plant growing there very freely, and it was from his specimens that it was described as I. laevigata, by Fischer in 1837.

Iris laevigata, Regel.

(“ *The Gardeners' Chronicle*”—*November 27th*, 1909.)

The plant described by “ *Regel, Gartenflora*,” 1864, *p.* 198, *t.* 442, and figured again in the “ *Botanical Magazine*,” *t.* 6132, evidently differs from the laevigata of Fischer and Meyer, and I incline to think that I have specimens of it now growing here.

In June of this year there flowered here several plants raised from seed and received as that of I. sikkimensis, an apparently undescribed species, said to come from the Himalayas. Of the truth of this I am not sure, but the fact remains that the flowers are extremely beautiful, of a rich, velvety, dark reddish-violet, set off with a golden signal patch. The falls are comparatively large, and sharply reflexed, while the tips of the standards and of the stigmatic crests rise to about the same level. There was no variation among the plants that flowered, and this points to the fact that we are dealing with a wild species. The capsule and seeds are both characteristic, but accurate information on these points is, unfortunately, lacking in the “ *Botanical Magazine*” (*t.* 6132), where the figure of I. laevigata apparently represents my plants.

One reason that makes me hesitate to decide whether my plants are I. laevigata or an undescribed species, is the fact that there exists at Kew an iris leaf or two, which Dr. Stapf sorted out from among the specimens of I. Clarkei collected on Tonglo by Sir Joseph Hooker. These leaves are distinguished by the prominent mid-rib, which occurs in my plants, and Dr. Stapf tells me that they agree in section also.

There, I think, the question must remain until some authentic, living specimens or seeds of wild laevigata are obtainable from Japan or Eastern Asia.

Iris lacustris.

(“ *The Gardeners' Chronicle*”—*January 25th*, 1919.)

This interesting little plant belongs to the Evansia section of the genus, being a rhizomatous species with crested falls. It is local in its distribution, and is apparently only found near the southern shores of the great lakes Superior and Huron, where it grows in moist, gravelly soil in half-shady spots near streams.

Specimens sent in November, 1918, by Mr. T. Smith, Newry, show peculiar arrangement of the ridges on the falls. There is a central, crinkled white crest, tipped with orange, and this is flanked by two lateral ridges. The colour is a deep purple, with a certain amount of white and paler lilac-purple in the region surrounding the ridges on the falls. The standards are usually more spreading and less erect than those depicted in the sketch.

The slender, greenish-brown rhizome spreads rapidly, and is capable of flowering at any time from May till October, if the conditions are to its liking, and if there is plenty of food in the shape of humus within its reach.

In order to obtain seeds, artificial cross-fertilisation is usually necessary in this country, and even then the small capsules do not contain a large number. The seeds are peculiar, for each has an attachment which is actually longer than its own diameter.

This peculiarity is only shared by I. cristata, and it seems better to look upon I. lacustris as merely a local form or sub-species of cristata. It is true that I. lacustris, when raised from seeds here, retains its dwarfer habit and the deeper colour in its flowers. Seeds of I. cristata have always refused to germinate here, and it is, I think, the only species the seeds of which, when ripened here and sown at once, have always failed to produce seedlings. My impression is that the colour of I. cristata is apt to vary from lavender to purple, and there is certainly a white form.

If therefore, we are unable to separate cristata and lacustris except by size and possibly colour, it is probably wiser to refuse specific rank to the latter.

As a garden plant it grows well in conditions approximating to those in which it grows wild. Here, in the dry sand of my garden, I give it old decayed leaf-mould and fine gravel in a position only reached by the late afternoon sun. Every two, or at most three, years I re-make the bed and replant the strongest young shoots immediately the flowers are over. Then root-growth is active, but it ceases altogether in autumn, a period, consequently, at which transplantation is usually fatal.

Iris Lisbonensis.

(" *The Gardeners' Chronicle*"—*March* 5*th*, 1910.)

Inability to manufacture a euphonious adjective out of Olisipo, the ancient name of Lisbon, has led me to suggest the above somewhat mongrel title for an iris which grows in the immediate vicinity of that city, and which has not been previously described, I believe.

This new species has come to light in the course of an attempt to straighten out the tangle that has long surrounded the Linnaean species biflora and aphylla. By the former, Linnaeus may have meant to describe the Portuguese plant, which Clusius found near Coimbra and called biflora, when he saw it in bloom in November, and heard that it also flowered in spring. Unfortunately, Linnaeus confused matters by referring to a figure in the " *Hortus Eystattensis* " called I. biflora, which undoubtedly represents the Central European I. aphylla, and his herbarium in the possession of the Linnaean Society contains a similar plant. Owing to this confusion it would seem necessary to drop the Linnaean name of I. biflora, and then Brotero's name of sub-biflora (" *Brotero Flora lusitanica I.*," *p.* 50, 1804) will stand for the Coimbra plant.

While going through the Portuguese specimens of this iris in the Kew Herbarium I found one plant that differed from I. sub-biflora in several ways, and which was collected on Monsanto. The chief difference lies in the fact that, whereas in sub-biflora the stem bears several small bract-like leaves and has small purple-stained spathes, the Monsanto plant has a naked stem, and remarkably long and broad, green spathe valves.

Not content to base a new species on this one specimen, I made enquiries in Portugal, and fortune favoured me, for it happened that my friend, the Baron de Soutellinho, formerly Mr. W. Tait, was able to send me a flowering specimen of what he believed to be I. sub-biflora, gathered by his brother on Mont Estoril, a hill in close proximity to Monsanto, on the outskirts of Lisbon. This plant, however, turned out to be identical with the Kew specimen from Monsanto, and I heard also from Professor Henriques, of Coimbra, that he knows the plant from a herbarium specimen as growing with Iris sub-biflora near Lisbon. Moreover, I find that a specimen was sent by Maw to Sir Michael Foster from the neighbourhood of Lisbon, and all these indications combine to show that the Kew specimen is no isolated abnormality, but really representative of a distinct species, which has hitherto remained unseparated from Brotero's sub-biflora.

In this new iris the leaves are of a somewhat yellowish green, about eight inches long at flowering time by three-quarters of an inch wide, the innermost pair almost hiding the bare stem. The spathes bear apparently one flower, and are two and a half to three inches long, somewhat inflated, and quite green at flowering time. There is no pedicel, but the tube is from one and a half to two inches long, greenish with purple stripes in the line of the standards. The falls are of a fine dark red, almost black-purple, the beard being bluish in front, then white, tipped with blue, and finally at the base beneath the styles white inconspicuously tipped with brown or yellow. The standards are of a somewhat lighter shade than the falls, with darker veins, and narrow gradually to the haft, which is veined with red-brown on a colourless ground.

Iris Lop-tec.

(" *The Garden*"—*June* 15*th*, 1918.)

This is one of the few hybrids between a bearded and a crested iris. It resulted from fertilising the Loppio form of Iris Cengialti with pollen of I. tectorum. This latter, as is well-known, belongs to the Evansia section, the members of which are distinguished by having a linear crest on the falls in place of the beard of several rows of hairs of the Pogoniris section. In the hybrid there is a distinct linear crest which splits up into a number of hairs, which, however, are still arranged in a single row. The shape of the flower is almost exactly that of the pollen parent, I. tectorum, of which both falls and standards are flat and spreading. The colour is a uniform dark purple and the spathe valves are scarious and brown, as in all forms of I. pallida, of which I. Cengialti is in reality only a dwarf local form. The spathes of I. tectorum remain green even when the flowers have expanded, but of this there is no trace in the hybrid.

The stem is about a foot or fifteen inches in height, and bears two flowers at the apex, and sometimes a lateral bud lower down. The plants are not very robust, but have lived on here for six or eight years, and have flowered well this year. The foliage is intermediate between that of the two parents, and the plants appear to be absolutely sterile, as I have failed to obtain seeds either by self-pollination or by using the pollen of either of the parents.

Iris masia.

(*" The Gardeners' Chronicle"—March* 5*th*, 1910.)

This new iris should be called I. masia and not I. Masiae, the name by which it was known to Sir Michael Foster; for as Dr. Stapf has very kindly pointed out to me, the ancient name of its habitat, the Karadja Dagh, was Mons Masins. Foster was evidently unaware of the origin of the name, which, in itself, contains further proof of the identity of the plant he received from Leichtlin with Sintenis's specimen in the Kew Herbarium.

Iris melaina.

(BAKERIANA X RETICULATA.)

(*" The Gardeners' Chronicle"—February* 15*th*, 1919.)

Iris Bakeriana is a delicate little species from the hills in Northern Mesopotamia, and though it lived and flowered here for some years with a glass roof over its head, I am afraid it has now succumbed to lack of attention during the war. It is, therefore, some consolation to find that this hybrid, of which Max Leichtlin sent me a single bulb some ten or twelve years ago, is able to hold its own in the open, and thus to atone to some extent for the loss of one of its parents. For, although it usually goes by the name of I. Bakeriana melaina, it is really a hybrid between I. Bakeriana and I. reticulata. This, I think, I have proved by making the cross and obtaining a range of forms, of which one or two were practically identical with Leichtlin's plant. The foliage of the hybrids is interesting, for, while the leaves of I. Bakeriana are cylindrical, with eight projecting ribs and those of I. reticulata are four-sided, those of the hybrids have six ribs.

Leichtlin's name of melaina, or black, is very appropriate, for the tips of the falls are of the most intense, velvety, dark reddish black-purple. The central portion is white with a number of irregular linear blotches of the same colour. It is interesting to note that, although all the members of my present little colony of bulbs have sprung as offsets from one original bulb, yet the markings are never exactly similar on any two flowers. Differences, at any rate in colour, can therefore arise in individuals that have originated in vegetative, as opposed to sexual, methods of increase.

Iris mellita.

(" *The Gardeners' Chronicle*"—*September*, 1913.)

This species was described by Mr. J. G. Baker in " *The Gardeners' Chronicle*," *December 2nd*, 1876, *p.* 709. The plant apparently has a large habitat, for although forms from different regions have been regarded by some as species, they are considered as being synonymous. The leaves are densely tufted ; the flowers are borne on short stems, usually in pairs. The perianth has a greenish tube blotched with red upwards, whilst the limb varies ; sometimes it is purple and sometimes yellow with longitudinal, reddish veins along the base. Iris mellita is considered to be synonymous with I. rubro-marginata of Baker (" *The Gardeners' Chronicle*," 1875, *vol.* III, *p.* 524), and I. straussii Dykes (" *The Gardeners' Chronicle*, 1909, *vol. xlv.*, *p.* 391).

Iris mellita var. rubro-marginata.

(" *The Garden*"—*November 2nd*, 1918.)

Any iris that will flower in mid-October in such an autumn as the present is a treasure, and though this little plant does not always give me flowers at this time, it has done so on more than one occasion. At present each tuft of leaves either has sent up or is about to send up its bud, and my impression is that if the plants are replanted in rather rich soil immediately after the normal flowering season in May, a second crop of flowers may be confidently expected in the autumn. The flowers are of a curiously smoky shade of purple, and the beard of closely-set white hairs tipped with violet stands out conspicuously on the sharply reflexed fall.

Iris mellita is the Balkan representative of the Austro-Hungarian Iris pumila, from which it differs chiefly in having a sharp, rigid keel to the spathes. In I. pumila the spathes are almost membranous, and so flimsy as to have no definite shape, while those of mellita are quite firm and rigid. As in I. pumila, the perianth tube of I. mellita is always one inch or two inches in length, while the stem is practically non-existent. I. mellita grows on the hills near Philippopolis, and is there apparently always purple, though in western Asia Minor, where the species also occurs, both purple and yellow forms are found growing together. In the variety rubro-marginata the young leaves, and particularly the spathes, are edged with red, but otherwise this form differs in no way from typical examples of the species. It was found originally by Barbey, a son-in-law of Boissier, growing near Scutari, on the Asiatic side of the Bosphorus, and I believe that my specimens, which came to me from M. Corrévon, a good many years ago now, are descendants of Barbey's plants.

Iris minuta, Iris kumaonensis caulescens and the Culture of Oncocyclus Irises.

(" *The Gardeners' Chronicle*"—*June 20th*, 1908.)

IRIS MINUTA.

The yellow variety of this iris, which is noticed by Baker in his handbook of the Irideae, flowered here for the first time on May 4th. It agrees with the type in all respects, except in colour, which is a bright yellow. The falls are marked with fine brown dots and lines down the haft and centre of the blade, and the edges of the standards are also brown. The plants were imported from Japan.

IRIS KUMAONENSIS CAULESCENS.

A few months ago I received from Messrs. Barr & Sons a small piece of the root-stock of an iris, with a note to the effect that it came from the Sikkim Himalaya. In appearance the root-stock resembled that of I. Duthiei, and I therefore planted it in a stony soil rich in humus, adding a little peat. The first flower opened on May 11th, and proved that the iris was a variety of kumaonensis distinguished from the type by having a stem nearly six inches long. The standards, of a pale mauve-lilac, are not held erect, but incline outwards, giving the flower a likeness in shape to I. tectorum. The falls are of a deep purple-lilac, mottled with a still deeper shade, while the deep orange tips to the fine white hairs of the beard are a distinct feature. The flower, unfortunately, only lasts for twelve hours, but thirty-six hours after it fades the second flower is fully expanded. The following is a detailed description:—Rhizome slender, short-creeping; tufts crowded; outer sheaths splitting up into fine fibres. Leaves linear, pale green, rigid, four to six inches long by one-third of an inch broad at flowering time. Peduncle four inches long, one-headed. Spathes two-flowered; valve lanceolate, pale green, two inches long; pedicles very short. Perianth tube one and a half inches long, dark purple; falls obovate-cuneate, two inches long, the outer one and a quarter inches reflexed, one inch broad, dark purple-lilac mottled in the centre of the blade with a darker shade; beard of fine white hairs tipped deep orange, arising from a white crest; standards spreading, oblong-unguiculate, two inches long and three-quarters of an inch broad, pale mauve-lilac; crests deltoid.

The Culture of Oncocyclus Irises.

Everyone who has ever grown these beautiful irises knows the difficulties under which they are cultivated. The chief of these perhaps arises from the fact that whether the rhizomes are in or out of the ground, they begin to develop shoots in October. They must, therefore, be planted in the autumn, and our variable winters play sad havoc with the young leaves, and the percentage of losses among a number of these plants is often high. In their homes in Central Asia these irises are frozen hard all through the winter, and cannot grow until the snow melts in spring. In order to reproduce these conditions as nearly as possible, I packed up a number of rhizomes last August in dry moss in a wooden box, and sent it up to the Imperial Cold Stores Co., at South Tottenham. There the box remained in a temperature of twenty-eight degrees to thirty degrees until the first week in March. On opening the box then the roots were precisely as they had been in August. I planted the rhizomes on March 9th, and the plants soon made healthy growth in warm, sandy soil, with a layer of old cow manure a foot beneath the surface. The buds are now showing, and the plants apparently in the best of health.

Iris nepalensis and its Neighbours.

(*" The Gardeners' Chronicle"—October* 1*st*, 1910.)

The name nepalensis was apparently first applied to an iris by D. Don in his " *Prodromus Florae Nepalensis*," which was published in London in 1825, and the description there given of the root-stock as resembling that of a hemerocallis leaves little doubt as to the identity of the plant described. Confusion, has, however, arisen with regard to the name because it seems to have been given by Wallich to a fine form of I. germanica with concolour blackish-red flowers, which is also a native of Nepal. The latter has been sent to me direct from that country, and is obviously identical, except in colour, with the common European type of I. germanica. Further confusion has been brought about within the last two or three years by the action of an Indian botanical garden, which distributed, under the name of nepalensis, some plants of Iris tectorum, which were obtained from the Shan Hills of Burma, in mistake for a species akin to I. nepalensis, to which reference will be made later.

The root-stock of the true plant in its resting state consists merely of a bud or growing point surrounded by the fibrous remains of old leaves, and having attached to its base about half-a-dozen whitish, tuberous roots, which are usually cylindrical, of about the diameter of a goose-quill. Sometimes, however, these roots are swollen towards their lower ends, but whether this peculiarity is the mark of a local variety or merely the effect of the nature of the soil in which this plant has been growing, is still a matter of conjecture. At any rate, these swellings are conspicuous on the roots of a number of plants, which I received from a Nepal valley to the north of Katmandu, whereas there is no sign of them either on a root from the neighbourhood of Simla or on the thirty or forty seedlings that I have raised from the Simla plant. My original plant has now survived four seasons here and has flowered regularly for the last three years. I have found it best to lift the plants when the leaves wither in October and store them for the winter under cover in dry sand. At the beginning of March they are planted out in a soil of peat, leaf-mould and old cow manure in a somewhat sunken position, where watering can be done easily if there is drought.

Iris nepalensis is peculiar in many ways. It is by far the latest of all to appear above the ground for there is no sign of it until about the beginning of June. Once, however, the slender point of the leaves is through, the ground growth is so rapid that the flowers open about the middle of July. The colour is a pale lavender produced by light violet veins on a whitish ground. All the six segments are of a delicate texture, and droop at about the same angle. The falls bear a yellow crest, which is divided up into hair-like points, and it is a pity that the individual flowers are so fugitive that they open and fade in the course of the same day. In respect of the seeds also, I. nepalensis stands by itself. The seed proper, which is more or less spherical, has attached to it along one side and projecting at each end a kind of wing-like appendage of much lighter colour than itself. The seed, I find, germinates very readily about the time when the mature plants begin to make visible growth. At the end of their first season, the young plants consist of two or three small whitish tubers attached together at the apex.

The home of this iris is on the southern slopes of the Himalayas, at any rate from Simla to Nepal, and its range appears to be continued far to the east, for it is abundant in Western Yunnan, where it has been collected in recent years by the Abbe Ducloux and also by Messrs. Forrest and Wilson. The curious appearance of the tuberous roots in the dried herbarium specimens collected by the first-named misled a French botanist into describing this iris as I. Yunnanensis of the Hermodactylus section of which the Southern European I. tuberosa is the only representative. But this new name can only rank as a synonym for nepalensis. The roots are in no way similar to the tubers of I. tuberosa, which are rather rhizomes than roots in the strict sense.

Reference has already been made to a Burmese iris. This is a plant of the same nature as the type I. nepalensis, differing chiefly by the fact that the flowers are practically sessile, while the stem of nepalensis is six-twelve inches in length. The dwarf plant is also much more floriferous and was named Collettii, after the discoverer, Sir Henry Collett. It appears to be identical with Sir Michael Foster's Letha variety of nepalensis, which came from the Letha range in the Shan Hills. Curiously enough, this plant also occurs in Yunnan, where it has been collected by the same three botanists. It has also been re-baptised in France as I. Duclouxii, and also wrongly described as a hermodactylus. Unfortunately, this plant is not apparently in cultivation, but it was Foster's experience that it was vastly easier to manage than I. nepalensis itself, and as it is very floriferous, its re-introduction is certainly to be desired.

At first sight these two irises appear to stand quite apart from all others, with no connecting links which might represent stages in the transition to another group. There exists however, in Western China and Tibet a small class of three irises—tigridia (Bunge), pandurata (Maxim) and Potanini (Maxim)—not one of which, unfortunately, is known to be in cultivation, so that we have to fall back for information on herbarium specimens, which, in the case of irises and other monocotyledons, are seldom entirely satisfactory. All these three species agree in having roots of a special type intermediate between those of an ordinary bearded iris and the tubers of nepalensis. This feature separates them at once from the western species, which they, in other respects, most closely resemble, namely, pumila, rubro-marginata (mellita) and chamaeiris. It is just possible that this small group does really represent an intermediate stage between nepalensis and Collettii and the ordinary pogoniris.

I. pandurata is only differentiated by Maximowicz from I. tigridia by the fact that its spathes are two-flowered, but specimens from the natural habitat show that both one and two-flowered stems are borne by the same individual plants, and it seems probable that it is really only a strong-growing local variety of I. tigridia. The latter has a stem of some four inches in length and purple flowers with a variegated beard. I. Potanini is stemless, with a lengthy, tapering tube, as in the true I. pumila, and the flowers are usually, if not always, yellow.

I. Potanini on the contrary is probably entitled to the distinction of being the species that has reached the greatest elevation of the whole genus, for it grows on the tops of passes in Central Tibet at the height of 16,300-17,800 feet. The flowers of Thorold's specimens, gathered in 1891, were so imperfect that a new iris Thoroldii, of the Apogon section, was published by Baker in Hooker's "*Icones Plantarum,*" *No.* 2,302, but others gathered in 1892 by Rockhill show the beard quite clearly and appear identical with Potanin's specimens from Kansu and Przewaldski's from Northern Tibet. Among the latter there occurs the purple-flowered form which seems always to be found sooner or later among those species of irises in which yellow flowers predominate.

If these species are eventually brought into cultivation it may well be that fuller knowledge of them will show their affinity to I. nepalensis is not as close as dried herbarium specimens seem to indicate, and now that so many new plants from Western China are making their way into our gardens we may hope to obtain these interesting irises.

Iris ochroleuca.

(" *The Gardeners' Chronicle*"—*November 6th*, 1920.)

In a recent note on this fine species, it was stated that it must be called I. orientalis and not I. ochroleuca. It is perfectly true that Miller's name of orientalis is older than that of ochroleuca, but we are relieved from the necessity of retaining it by the fact that his text gives the iris a beard (" corollis barbatis "). Moreover, he supports this mistake by a figure which shows a curious transverse beard running across the falls. Miller is probably also mistaken in saying that I. ochroleuca comes from Carniola, for it seems certain that it is a native of Asia Minor, not of Europe.

I. ochroleuca is well-named, for it is pre-eminently the white and yellow iris and, as it happens, it is most convenient that this name should stand instead of orientalis, for the latter is needed for the eastern ally of I. sibirica. The curious fact about I. sibirica is that there appears to be no evidence that it grows anywhere east of the Ural Mountains. It is a native of Central Europe and is found in Germany, Switzerland, Hungary, North Italy and Central Russia. Between the Urals and Corea there is, I believe, no recorded trace of any specimens of I. sibirica or of closely-allied species. In Corea, however, there occurs a form which is in some ways intermediate between sibirica and orientalis, and it is readily distinguished by the green ground colour that underlies the purple veining on the throat and haft of the falls. Typical I. sibirica has comparatively small flowers raised high above the foliage, and large flat seeds, in shape like a capital D. The capsule is broad and rounded. I. orientalis, on the contrary, comes from the extreme east, namely, from Japan, and has relatively larger flowers. The stems are approximately equal in length to the foliage, but the latter droops and so allows the flowers just to stand clear of the leaves. Other characteristic features are found in the small cubical seeds and in the narrower, sharply three-cornered capsules.

The well-known Snow Queen has thus nothing whatever to do with Iris sibirica, but is an albino form of the Japanese Iris orientalis. Indeed, it probably arose under cultivation in Japan and can easily be distinguished from the white forms of European species. In these the flowers are much smaller and usually veined, and often tinged with lilac or purple. For garden purposes the most decorative plants result from crossing the two species, for the hybrids usually have the large flowers of I. orientalis on the tall stems of I. sibirica. Variations in colour may easily be obtained in either species by crossing the white and the blue forms, and this method is capable of producing a colour that is near to a real sky-blue.

Oncocyclus Irises from Seed.

(*" The Gardeners' Chronicle"—May 5th,* 1906.)

Mr. Jenkins' remarks on raising Oncocyclus Irises from seed have tempted me to say a few words. I have for many years past raised these irises from seed, and have carried some kinds through three or four generations. Without these seedlings some kinds would have disappeared from my garden much more rapidly than they have done, but I cannot say that I have been able to observe any distinct adaptation to the demands of our unfavourable English conditions. A seedling is nearly always, for a certain length of time, more vigorous than a plant grown from an offset. If allowance be made for this, the plants raised from seed are as difficult to rear successfully as are other plants. The Palestine Oncocycli, for instance, raised from seed are just as troublesome as imported ones.

Both Oncocyclus and Regelia Irises go to seed very freely with me, and this leads me to suspect that even in their native homes they may be short-lived, reproducing themselves largely from seed. There is no trouble about getting seed; the difficulty lies in raising plants from seed. The seeds are very slow and uncertain in germination. Those sown in the open sprout more freely than those sown in pots. But, on the other hand, the seeds sown in pots are much more under command than those sown in the open. The top soil in a pot can be sifted at any time ; the seeds being large and easily handled, can be picked out and sown again. A gathering of seed can be kept under observation for many years, and this is desirable, for, as I have said, germination is very slow and very uncertain.

When a pod of seed, containing about forty seeds, is sown as soon as ripe, say in July, in a pot, and left to itself, the next spring there may appear one or two plants, or very rarely a good many more, frequently none at all. The second year the same varied results may be obtained, and so in succeeding years. The pot, however, may remain several years without further germination taking place in it, and then in another year or two, or even several, plants may appear. I have, therefore, been led to keep my seed-pots for many years, so long indeed as any sound hard seed remained in the pot. I have thus raised plants from seed which had been sown fifteen years previously, and the plants thus obtained were as vigorous as those which came from seed which had germinated quickly. I imagine that if I live I shall find the period during which the seed remains alive and capable of germination to be even longer than the fifteen years which I have now actually observed.

Some years ago I made a number of experiments with a view to getting more command over germination. I subjected the seed to various conditions, but I got no satisfactory results, and since then I have adopted the practice of leaving the pots in the open, rarely, if ever, watering them, not protecting them at all, but simply allowing them to get such good or harm as they might from rain or drought, frost or sun.

When the seeds are sown, not in pots, but in the open border, in prepared seed beds, they germinate, as I have said, more freely, but it is almost impossible to keep such beds under inspection and free from weeds, etc., for a sufficiently long time. But I have seen enough to convince me that, even in the open, seeds may germinate after many years. I find myself each year hesitating between sowing seeds in the open bed or in the pot, each method having its own advantages.

But the difficulties are not over when the seed germinates. The young Oncocyclus (or Regelia) Iris grows very, very slowly, and I lose many of the seedlings in the first year. Some, especially the kinds from Palestine and the hybrids from these, are very apt to germinate in late autumn, and great care is then needed to carry them through the following winter, for these tender seedlings cannot withstand frost.

I take the seedlings from the pot and re-pot them almost as soon as they appear, and then grow them singly in pots until they are large enough to be planted out. This process retards their growth. Those sown in the open grow more rapidly and strongly, but, when left in the bed, many of them succumb in the winter unless most attentively watched; they are thrown up out of the soil by the frost, and if left exposed are killed. Those, however, which survive come to flowering estate earlier than those nurtured in pots.

After the first year the difficulties are less. During the second year some succumb, and that whether the resting period is secured by taking them up or putting lights over them, but many grow up into good strong plants, flowering the third, fourth or some later year.

The difficulties on which I have dwelt are mainly with the Oncocyclus Irises and their hybrids. The Regelia Irises are much more easily dealt with, for these will often flourish without lifting or drying off with lights when planted in good rich soil in dry, open sunny situations. The seed of plants which have not been hybridised I sow in the open and leave the seedlings, without taking any special care of them, in the seed-bed until the summer of the second year. I then take them up, " dry them off," and re-plant them in late autumn. There is no difficulty in thus obtaining a large number of flowering plants. The seed-bed, after the removal of the seedlings, should still be watched as a seed-bed, for many seedlings will appear in subsequent years.

With the seed obtained by crossing a Regelia Iris with an Oncocyclus Iris (and I have had many crosses of this kind) I am naturally more careful, sowing the seed in pots, or, if I sow it in the open, I give them special attention. But the seedlings are much more vigorous, much more easily dealt with than seedlings coming from crosses of Oncocyclus Irises among themselves. The greater robustness of the Regelian parent, whether father or mother, makes itself most distinctly felt in the offspring. All these Regelian hybrids are more or less beautiful, some of them exceedingly so, and I find myself leaning more and more towards them ; they give a far better return for one's labour than do the wayward, fugitive Oncocycli.

I have also raised a large number of crosses between irises of the Oncocyclus and Regelia sections with the bearded irises, I. pallida and others. The seed of these germinates slowly and uncertainly ; the seedlings grow for the most part slowly at first, though some show from the very outset considerable vigour. The plants thus raised have the advantage of not needing any summer rest. They flourish quite well when left to themselves. Some are very robust, increasing rapidly and rarely " go off " ; others do not do so well, increasing slowly, and showing a tendency to decay in the root stock. As a rule, moreover, they do not flower freely, but I find that in this respect they improve if left undisturbed for several years. Unfortunately none of them possesses the rare and delicate beauty of the pure Oncocyclus or Regelia type, though some of them come near to this. Many are grotesque, some even absolutely ugly, and have to be destroyed. All of them are very sterile, whereas the Regelio-cyclus hybrids bear seed freely. In the course of many years I have only succeeded, in spite of active pollination, in getting a score or less of sound seeds from a large number of blooms, and very few of these have germinated, so that I see little chance of taking advantage of the Mendelian law in respect to them.

Iris pumila.

(" *The Garden* "—*May* 16*th*, 1914.)

The true I. pumila has practically no stem, but a perianth tube of two inches or three inches in length. I. pumila is in many localities even more variable in colour than I. chamaeiris, which in some districts is all yellow, in other all purple, while in others, again, many colour varieties are found growing together. Unfortunately, the true I. pumila is comparatively rare in cultivation.

Iris pumila.

(" *The Gardeners' Chronicle* "—*May* 6*th*, 1911.)

Great as is the confusion in iris nomenclature no name is probably so frequently misused as that of I. pumila. It occurs in every nurseryman's catalogue, but it is extremely rare to find a specimen of the plant in their gardens, except in the shape of I. pumila coerulea, which is a true pumila. Of this, there are in commerce at least two forms, one of which is slightly larger than the other and vastly more vigorous and floriferous. I. pumila is indeed one of the most floriferous of all irises. In most species it is only the central growth at the end of the rhizome that produces a bud, but in I. pumila as many as three or four of the growths on either side are also capable of flowering, so that each small rhizome may produce as many as nine flowers.

The home of the species ends in the west of the hills near Vienna, where it grows abundantly in many colour forms, red-purple, blue-white, and yellow. The plant can there be traced eastward down the Danube, round the Black Sea by Odessa and the Crimea to the Volga, beyond which it does not apparently extend.

The features of the true plant are firstly, the absence of stem, secondly, the long (two inches or more) perianth tube, thirdly, the loosely-wrapping and, as it were, shapeless spathe valves, and, lastly, its early flowering habit, for the true I. pumila is always the first of the bearded irises to flower. The plants with which it is confused are forms and hybrids of the French and Italian irises, to which the names lutescens, chamaeiris, olbiensis, and italica have been given.

In these the stem is always obvious, although often only an inch or two in length, the perianth tube is not much more than an inch in length, the spathe valves are keeled, and their outline is better defined, and the flowering time is a week or two later than that of I. pumila.

Iris pallida dalmatica.

(" *The Garden* "—*July 6th,* 1918.)

This is a good example of one of the finest of the older garden irises. The strong growth of the glaucous grey-green leaves and the large flowers of good substance on sturdy, upright stems combine to make the plant conspicuous in the border in early June. The colour of the flower is a uniform pale grey-lavender, and the beard is a deep yellow.

Whether the plant has any real claim to the name of dalmatica, which it has borne for so long, is at least doubtful. My own impression is that it has no claim whatever to come from Dalmatia, and this was confirmed by all I could ascertain from local botanists when I tramped about the Dalmatian coast in 1912. Iris pallida in one form or another is widely distributed over the eastern coast of the Adriatic. I found it on Monte Spaccato, which is merely one edge of the plateaux which rise rapidly behind Trieste. There it is a slender plant some eighteen inches in height, closely resembling the Loppio form of I. Cengialti. I found similar forms at Bollunz and Poppecchio in Istria, and others on Mount Veljun at the head of the valley which ends at Zengg on the Croatian coast.

Further to the south, on the Velebit Mountains behind Carlopago, at an elevation of nearly four thousand feet above the sea, I found some very dwarf forms, barely a foot in height, but it was not until I got to the neighbourhood of Ragusa that I found anything like what is usually known as I. pallida in our gardens. There, however, I found a cliff covered with thousands of plants of every shade of blue-purple and red-purple, but in every case the build was slender and the stems were inclined to be flexuous and to bear their flowers rather crowded together at the top than set well apart, as is the case in pallida dalmatica. It is possible that still further south—in Albania, for instance, or in Greece—there may be pallidas like the so-called dalmatica, but there is no herbarium evidence of their existence, and, on the other hand, I have obtained from the neighbourhood of Bozen in the Tyrol plants which differ much less from " dalmatica " than those of the Dalmatian coast. The stem is stiffer and the flowers are of more substance, even if they have not the widely spreading falls which are so conspicuous a feature of " dalmatica." The latter may be a seedling or even a hybrid form of the Tyrolean pallida, a supposition which is perhaps confirmed by the scantiness of its pollen and by the fact that it seldom produces fertile seeds. The few seedlings of this iris that I have succeeded in raising have not inherited its characteristics, but have rather resembled what is known as typical pallida, being more slender in growth and with less substance in the segments of the flower.

I. pallida is almost certainly one of the species that underlie the majority of our garden bearded irises, and with its purple shades in combination with the yellow of I. variegata we have at once most of the colour elements that go to make up their flowers. At the same time it is surprising how large a range of forms as regards both colour and habit can be found among the pallidas alone. They always seem to keep their uniform colour throughout the whole flower and their free-flowering habit, which are perhaps their most valuable points as garden flowers.

Iris paradoxa var. Choschab.

(" *The Gardeners' Chronicle*"—*June 4th,* 1921.)

Iris paradoxa was rightly named " the unexpected," for it is entirely unlike any other species. Its home is in the mountains in Talisch and Northern Persia, which surround the south end of the Caspian Sea. The first-discovered specimens were of the form which has been more frequently in cultivation, and which has the groundwork of the standards of a blue colour instead of the silvery white of the form illustrated in the supplementary coloured plate. This was named Choschab, after a locality from which Mr. C. G. Van Tubergen, of Haarlem, obtained a supply of plants. A further supply of this form was obtained, and I considered myself fortunate when six plants gave me six flowers of this magnificent iris. The leaves are narrow, inclined to be falcate, and of a pale, glaucous grey, distinctly paler than the spathe valves, which are very long and somewhat inflated. The stems are about four to eight inches high, and, unfortunately, in common with all Oncocyclus Irises, produce only one flower each. When the flower has been open for about twenty-four hours, the standards lean outwards and then show two rows of dark violet hairs on the lower part of the haft.

The most remarkable feature is, of course, the appearance of the falls, which resemble rather the back of a large bee than any part of an iris. The edges of the haft bear thick blackish veins on a dull pink ground, while the whole of the rest of the surface is covered with short, thick-set black hairs, which stand so closely together as to give the effect of velvet both to the eye and to the touch. The ground colour is a pale pink, which appears in a narrow crescent or chevron-shaped patch at the end of the beard, only to be almost entirely obscured again by the velvety black colour of the tip of the small blade, which is not separated by any constriction from the broad haft.

The standards are very flimsy in texture and bear dotted, blue-purple veins on a silvery white ground. The haft is narrow and veined with brown-purple at the base, just above which it bears two central lines of dark violet hairs, one on each side of the central channel.

The styles are yellow, closely veined and dotted with red-brown, and the small reflexed crests are of the same colour.

The Reticulata Group.

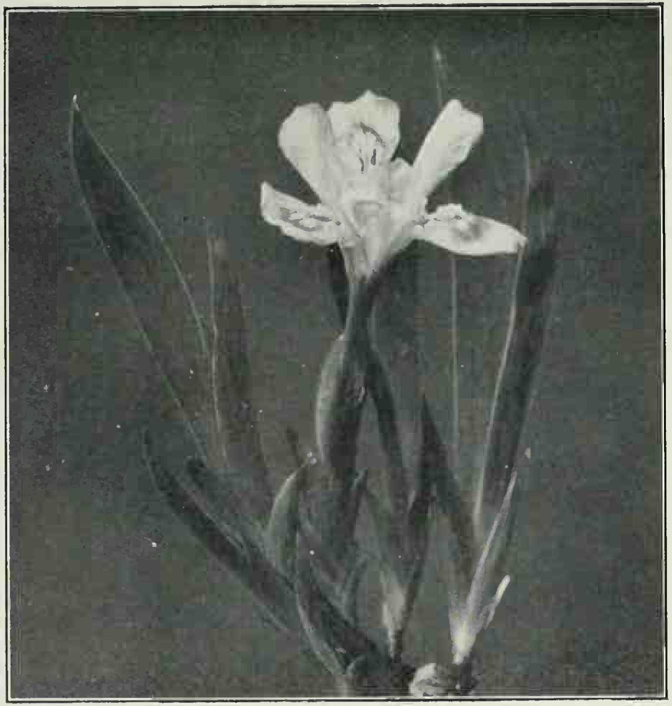
(" *The Gardeners' Chronicle*"—*February 28th*, 1914.)

The first sight of the confused fragments of a puzzle which have to be fitted together is apt to be disheartening. Scarcely any two pieces seem to belong together, and the majority, indeed, appear to be so detached from the rest as to be quite meaningless. Such has hitherto been my feeling with regard to the disconnected facts that have constituted our knowledge of the group of early-flowering bulbous irises, of which I. reticulata is the best-known example. It cannot be pretended that all the fragments can yet be made to fit together into a complete picture, but it is, perhaps, possible to suggest some definite arrangement and to ask whether facts within the knowledge of others who are interested in the group seem to them to fall into their places in the scheme.

The chief difficulty lies, of course, in obtaining specimens of wild plants from known localities. Importers and collectors are only too inclined, perhaps not unnaturally, to be reticent as to the precise localities from which their supplies come, and herbarium material is not always sufficiently carefully prepared to enable us to see clearly the somewhat minute points of difference.

Anyone who has grown I. reticulata, I. histrio and I. histrioides must have noticed that there are marked differences in the methods of increase of these plants. Flowering bulbs of the two latter species form round their bases a cluster of as many as twenty or thirty small bulblets, no bigger than, and not unlike in outline to, grains of wheat. I. reticulata, on the other hand, forms a much smaller number of relatively large bulbs differing considerably in size one from another. The smallest, however, is usually three or four times the size of the bulblets formed by the other two species. As far as my information goes, I reticulata is confined to the Caucasus region, and it is only there that irises are found which increase in the same way. All the other members of the group form the innumerable bulblets already mentioned, and come from further south. The only exception is I. Bakeriana, which is easily distinguished by the character of its foliage, as we shall see later.

There can, I think, be little doubt that the deep violet-blue I. reticulata of our gardens is not the commonest form of that species in its native home. Indeed, I have so far failed to find any scrap of evidence to prove that it is not merely a colour form of garden origin. Bieberstein's original figure ("*Cent. Plant. Rar. Taur. Cauc.*," *I.t.* 11, 1810) does not even justify the assumption that this is his type. On the contrary, his drawing represents much more faithfully the red-purple flowers, which have always been the product of any bulbs which I have received direct from the Caucasus, and also of those plants that I have raised from seeds from the same source. The actual shade of red-purple is apt to vary and the blade of the falls is usually more or less conspicuously veined, the style-



IRIS LACUSTRIS

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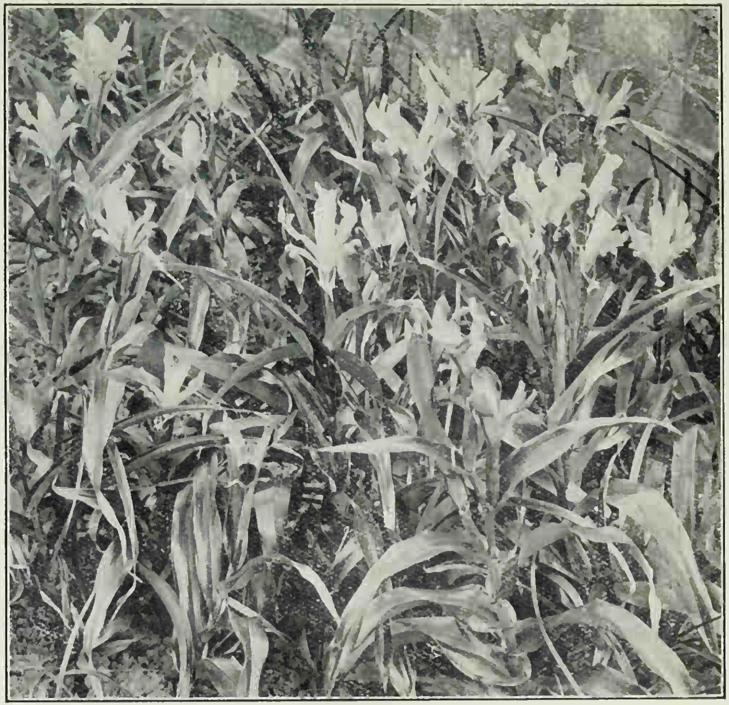

IRIS BUCHARICA

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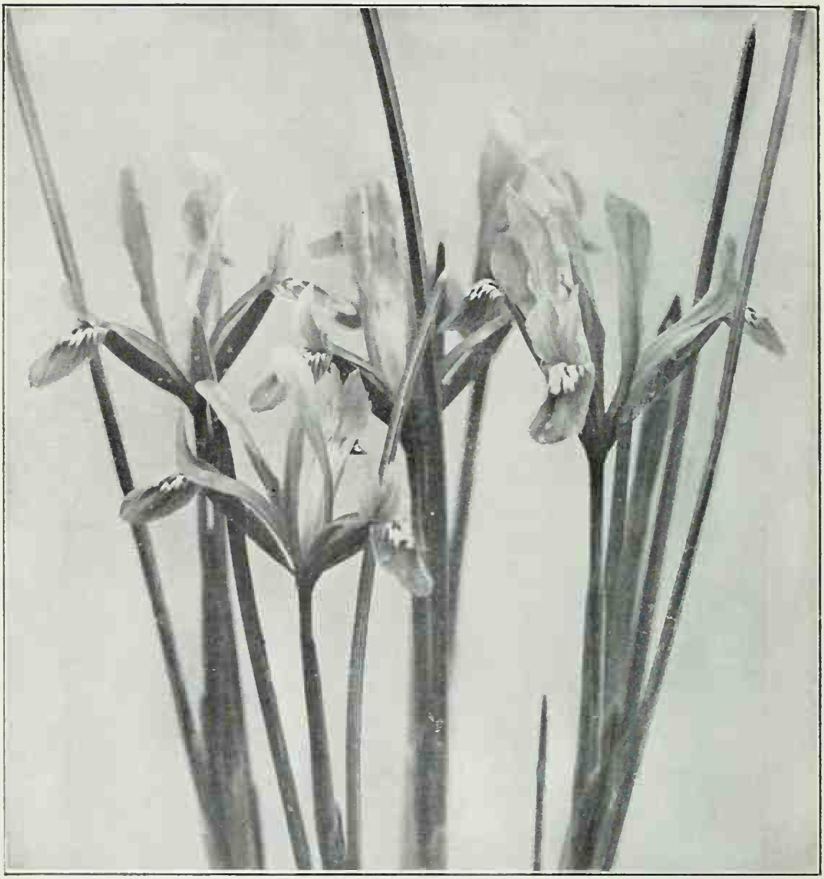


IRIS RETICULATA

See page 1 and index

branches are broader than the haft of the falls, and the standards, also, are broad and tend to curve inwards to meet each other instead of pointing outwards at nearly the same angle as the style-branches as do those of I. reticulata.

The view that a red-purple flower is the common wild form is supported by the fact that self-fertilised seed of the type has never given me anything but red-purple forms. This has also apparently been the experience of others, and yet it is a result which no Mendelian theory seems able to explain.

There is yet another tone of colour, which is found among the forms of this Caucasian iris. It is a peculiar slaty-blue, sometimes quite dark, and sometimes so pale that one sturdy example has even received the name of Cantab.

As we leave the Caucasus region and go further south, we come to the home of I. histrioides in the neighbourhood of Amasia or Amas. Its habit suggests that it is an inhabitant of mountainous districts where the winters are severe, for the flowers come up almost simultaneously with, and sometimes even before, the leaves. The flowers are flatter and less funnel-shaped than those of the Caucasus group, and of a vivid blue colour, except in the upper part of the blade of the falls, where there occurs a triangular white patch veined and dotted with blue. All these characteristics are found in home-raised seedlings of this species, and, as has been already observed, it differs sharply from the Caucasus plants by its method of increase.

With I. histrioides I am inclined to connect somewhat closely the plant to which Michael Foster gave the name of sophenensis, in memory of the fact that it came to him from the neighbourhood of Kharput, a district which in ancient times bore the name of Sophene. This iris has flowers of the same shape as those of I. histrioides, but smaller. In neither does the central ridge on the falls fade away, as in I. reticulata ; in both it is carried all along the haft, as was also the case in Leichtlin's purpurea. The latter does not now seem to be in cultivation, but this feature and its short leaves are perhaps enough to justify us in assigning it to this group of plants. We seem also to have lost the colour-forms of sophenensis, which Foster tells us (*" Bulbous Irises," p.* 7) may vary from red-purple to a lightish blue. The only form which I know, and which comes true from seed, is of a pale blue colour, with a lemon-yellow central ridge, much resembling a rather small pale histrioides. Among seedlings of the latter, variation in the exact shade of colour occurs both in the flowers as a whole and in the yellow ridge on the falls.

Going still further south, we come to the region where I. histrio is native. Our difficulty here lies in the fact that it is no longer possible to say with certainty to which of two distinct plants the name was originally given. It is, perhaps, rather more probable that it was bestowed on a plant with upright standards and very conspicuously blotched falls, which seems to be confined to Palestine, if not indeed to Lebanon. This iris has been distinguished as histrio orthopetala, and it is evidently closely allied to the form with divergent standards and less conspicuously blotched falls, which is common in the neighbourhood of Marash, and which is now commonly supplied by the trade for the more showy orthopetala. Both produce numbers of minute bulblets, but they differ from the two groups we have already considered by the fact that their foliage, though longer, is more slender and less erect. It is far less rigid, and seems always to begin to curve as soon as it emerges from the soil. The prevailing colour of the flowers is a blue-purple, and the falls are either dotted or veined more or less distinctly.

It is interesting to notice that of this iris, too, there is now known a red-purple form, atropurpurea. As reticulata and Krelagei only differ in colour, so does this plant resemble what is probably the northern form of histrio in every respect but that of colour, except that the central ridge is here non-existent, though the black tubercles that dot the low ridge in histrio are here conspicuous as raised points along the central line of the haft of the falls.

Further south still, we come to I. Vartani, which is hardly more than another development of I. histrio. It is distinguished by the length of its style-crests, and for us in the north by its inability to survive our climate for more than a year or two at the most. Of the white form of I. Vartani, some examples are beautifully spotted with blue, and we can only regret that this iris has such a poor constitution.

There remain two outlying species, which are easily separated. To the west, in Asia Minor, occurs I. Danfordiae, which is distinguished by its minute bristle-like standards and by its yellow colour, while to the east is found I. Bakeriana whose eight-ribbed leaves divide it at once from all the other irises we have considered. That I. Danfordiae has been described under more than one name is due not to the variation of the olive-green markings which sometimes occur on the blade of the falls and on the backs of the style-branches, but to the fact that the first-described herbarium specimens have lost their outer bulb-coats, with the result that the description did not mention their reticulated structure. Baker was thus led to class this iris among the Junos on account of its minute standards, and it was only when the plant was re-discovered by Bornmuller that Haussknecht, seeing the reticulated bulb-coats, thought he was describing a new species under the name of I. Bornmulleri.

Definite dates for the flowering of these plants are most misleading. This year I. reticulata is in full flower in the middle of February, while I have known it so late as the last days of March. And yet, if, as seems not improbable, all our stock of I. reticulata has arisen by division from a single bulb, we might reasonably expect it to be much more constant in its time of flowering than any other of these species, where seedlings are innumerable and differ considerably in their time of flowering. For instance, this season I had some I. Krelagei in flower in the last days of November, though this is no doubt exceptional, while others have yet to open their buds at the end of February. Much depends, I believe, on the date at which the growth of the previous year was ripened off, and on the weather during the late autumn and early winter. The embryo flower is already in the bulb when we plant it in the autumn, and it is not difficult to imagine that external conditions have great influence on the flowering-time of bulbs which develop their flowers with such amazing rapidity as do these small irises. My experience is that imported bulbs and those that have been lifted flower earlier than those left in the ground, and this is probably to be explained by the fact that the ripening has been more complete.

There is one other point that may be of some interest. I. Bakeriana is admittedly of poor constitution, and apparently nowhere in England does it do really well. For several years now I have grown it side by side with a beautiful hybrid form, of which the late Max Leichtlin sent me a single bulb under the name of Bakeriana melaina. The latter increases regularly by offsets, and this year there have appeared ten flowers, though the type has been flowerless. Melaina has six-ribbed leaves and is probably a hybrid of Bakeriana and some reticulata iris. Its falls are of the richest velvety-violet, and the interest of the plant is that there are now considerable differences among the flowers produced by the different bulbs in the extent of the triangular white patch at the throat and of the arrangement and number of the dark-violet blotches upon it. Seeing that such differences, small though they are, do undoubtedly arise among the individuals obtained by vegetative increase, we can form some idea of the possibilities of variation among the forms of these irises which nature has evolved by sexual reproduction.

The Reticulata Section.

(" *The Garden*"—*April* 13*th*, 1918.)

Visitors to my garden often ask what first induced me to take up the cultivation of irises, and my answer is that it was the desire to grow something which from the open ground would give me flowers in those winter months when most small gardens are entirely devoid of flowers of any kind. The first flowers of my first reticulatas proved so fascinating that, once I had seen them open in my garden, I was eager to go on growing all obtainable irises, raising seedlings of them and hybrids between them. It is seldom now that a week passes in any year, except, indeed, during unbroken spells of frost and snow, without some iris buds appearing. The well-known Algerian I. unguicularis (*syn.* stylosa) is a great stand-by in the darkest days of winter, especially when the clumps have become well established in some warm, sunny corner against a wall, where slugs and snails are not too numerous and the soil is light and poor, but, once we have reached the new year it is seldom long before the first buds of some reticulata Iris emerge from their sheaths.

The name reticulata was given to draw attention to the fact that the outer coat of the bulbs consists of a network of fibres. All the members of the section are found in the region lying between the Caucasus and the Dead Sea on the north and south, and western Asia Minor and Mesopotamia to the west and east. I. Kolpakowskiana and I. Winkleri are so imperfectly known that their position in the genus is still a matter of conjecture.

The first to appear is usually I. histrioides, which in its best form from the neighbourhood of Amasia in northern Asia Minor produces a magnificent flower quite five inches across. The colour is a bright rich blue, with a certain amount of white groundwork appearing in small patches on the blade of the falls. The flowers appear with extraordinary rapidity when a few warm days follow a period of frost and snow, and shoot up so rapidly that they out-distance the points of the stout, four-sided leaves. Of this iris there is an inferior form, called sophenensis, from the ancient name of the district from which it comes. Its colour is inclined to be a rather dull blue of a slaty shade, and the plant is smaller in all its parts and in every way less desirable than the type.

Further south in Asia Minor we get I. histrio, so named because its livery was thought to be as gaudy as that of an actor. The colour varies a good deal, but nearly always consists, on the falls, of a mottled effect produced by spots and blotches of two shades of blue-purple. I. histrio is at once more slender and, in my experience, more delicate than I. histrioides, though some of its forms are very beautiful. The most remarkable was sent to me from Marash, and had flowers which were wholly of a dark reddish-black. For some years it led a precarious existence here, but now I am afraid the last bulb has succumbed. Possibly in other English gardens the bulbs might have been more vigorous, for I am inclined to think that Asia Minor plants are, as a whole, peculiarly unsuited to light sandy soils. Chionodoxa is a pleasing exception, but it may well be that its home is on some comparatively rare geological formation and not on that heavy red clay soil which is so often found in limestone districts in Southern Europe and apparently in Asia Minor, and which seems to contain some plant food that cannot be artificially supplied with any certainty. The yellow I. Danfordiae is another example of this difficulty. After a bulb has flowered, it does not seem to form a few bulbs of which one or two will flower the next year and the rest in the year after, but a vast number of bulblets no bigger than a grain of wheat, which I find it difficult in this poor soil to nurse on till they become strong enough to flower.

Reticulata itself is easier to manage and increases rapidly unless the bulbs fall victims to the fell disease which sometimes carries off whole colonies. The remedy seems to be to lift the bulbs annually and to replant them again shortly afterwards in fresh soil. The bulbs should be carefully picked over while they are out of the ground, and any " suspects " burnt.

One of the puzzles about I. reticulata is how the well-known deep blue form ever came to be known as the type. All the wild examples that have ever reached me from its home in the Caucasus have been of the red-purple shade that is claimed for Krelagei, and Bieberstein's original illustration (M. Bieberstein, " *Cent. Plant. Rar. Taur. Cauc.*," *I.*, *t.* 11 (1810)) is apparently neither the one nor the other, but a paler blue form more like that which Mr. Bowles discovered in his garden and christened Cantab. The latter now rejoices, I believe, in a first-class certificate, though I must confess to being surprised when I read that it had attained to that honour. It is undoubtedly distinct and of good constitution for a reticulata, but it always seems to me that plants that lend themselves to being grown in a mass in pots or pans fare much better at the hands of the Floral Committee of the Royal Horticultural Society than do others which are only at their best in the garden. I may be prejudiced, but it does seem to me that there are a good many more strikingly handsome and more easily grown garden irises than Cantab, though the latter may be more readily conveyed to a show in good condition.

Another puzzle connected with I. reticulata is that seedlings of the blue type always, in my experience, give red-purple forms. It is only in the second generation, produced by cross-fertilising the red-purple seedlings among themselves, that blue-purple forms like the so-called type appear. This result does not seem to tally with the Mendelian laws, for whether the red colour were dominant over the blue or the blue over the red, by no known law would the self-fertilised blue give all reds in the first generation.

Perhaps the most difficult of all the reticulatas to grow is I. Vartani, from the neighbourhood of Nazareth. It is distinguished by the long style-crests and by its strong scent of almonds. The colour is usually a pale slaty-blue, though a few years ago there was obtainable a white form, of which some were beautifully mottled with pale blue. I. Vartani was valuable because freshly-imported bulbs could be relied upon to flower by Christmas, if not earlier. Let us hope that we shall be able to import it again before long.

Anyone who delights in brilliancy of colouring and in velvety texture of petal, rather than in the size of flowers, should obtain a few bulbs of I. Bakeriana and make crosses between this Mesopotamian species and the best forms of reticulata and Krelagei. The deep velvety lip of Bakeriana seems always to be present in the hybrids, and this species, which has no yellow in its flowers, seems also able to suppress the orange central line of reticulata. Many years ago now Max Leichtlin sent me a present of a single bulb labelled Bakeriana melaina. When it flowered I suspected this "black" Bakeriana of being a hybrid of Bakeriana and reticulata and determined to try the cross. Two or three years ago the descendants of Leichtlin's bulb and the first of my hybrids opened on the same day and were identical. There has been much variety among these hybrids, some of which I hope to be able to keep and grow on, but some of which I have lost through careless treatment, owing to lack of labour in these hard times.

It would be interesting to see what the result of hybridising I. Danfordiae with any other reticulata would be. Would the yellow colour be altogether obscured, and would the minute bristle-like standards become lengthened and more obvious? No hybrid of this iris is, however, known at present.

Seeds of the reticulatas should be sown early in the autumn in fairly deep pots of rich soil. The pots should be left in the open until the seeds germinate early in the new year. Then the protection of a cold frame will do them no harm, and they may be left there to become quite dry in summer. Later on they should be put out in the open again in the same pots for the winter. At the end of their second season they may be sifted out of the pots and planted out in nursery beds, where they will flower a year or two later.

All the species and forms look best when growing either in the rock garden or among dwarf shrubs at the edge of a shrubbery. The type especially goes well with Chionodoxa sardensis, and I advise anyone who has not seen them together to try the effect.

Iris reticulata is often said to be capricious. Perhaps it is, but the truth seems rather to be that it suffers from having to make its growth amid the frequent changes of temperature which render the early months of the year so trying in England. The best we can do is to make the bulbs strong by good feeding, and this is more easily and safely done by planting them in soil that is naturally rich in plant food than by trying to enrich poor soil at the planting-time by a liberal addition of half-decayed leaf-mould or manure. Both of these are only too apt to foster the fungoid growths to which the bulbs are such easy victims. The bulbs should be lifted as soon as the foliage has turned yellow, and it may sometimes be useful to know that little harm is done to them if it is necessary to shift them when they are actually in flower.

Iris reticulata atropurpurea.

(" *The Gardeners' Chronicle*"—*February 20th*, 1909.)

A remarkable form of Iris reticulata which is, as yet, I believe, undescribed, is now flowering here for the first time. It might even be given rank as a distinct species if specific names are given to histrio and histrioides, but, if these are regarded merely as local varieties of I. reticulata, then this new form may be known as I. reticulata atropurpurea.

During last summer I received a few bulbs of I. reticulata from Marash, in Asia Minor, and this flower now appears among them, together with a very fine form of histrioides distinguished by the fact that the deeper shades of blue on the falls occur rather as mottlings than as blotches.

The buds of the variety atropurpurea appear when the two four-sided leaves are only two or three inches high. They somewhat resemble buds of I. Krelagei, but differ in having veinings of purple-red on a whitish ground.

When the flower unfolds, the blade of the fall is seen to be of a uniform velvety-black, which fades a little to red-black at the edges. There is only the merest trace of a signal or ridge in the form of a minute touch of dingy yellow, but along the haft there runs a row of glistening black spines about a sixteenth of an inch in height. These stand out conspicuously on a black ground, which is bordered on each side by a slightly lighter, reddish groundwork veined with black-purple. The small narrow standards are dark, blackish-red, widening at the top, with a characteristic outward curve, whilst the styles are of a somewhat lighter shade of red, especially at the edges. In one respect this iris differs from all other forms of I. reticulata, namely, in having spathes that are veined and blotched with red-purple. In other varieties the spathes are either green or colourless, but in this case it is hard to distinguish the spotted spathes from the similarly spotted tube.

I. reticulata x I. Bakeriana. I. reticulata. I. unguicularis. I. Rosenbachiana.

(*" The Gardeners' Chronicle"—March* 18*th*, 1916.)

I. RETICULATA x I. BAKERIANA.

Ten years ago the late Max Leichtlin sent me a single bulb of what he called Iris Bakeriana melaina, with a note to the effect that it was a better " doer " than I. Bakeriana, and that it spread fairly rapidly and formed little clusters of bulbs that flowered freely. The plant has lived up to its reputation, and I have at present a little patch bearing well over a dozen blooms. The flower is practically of the same size as that of I. Bakeriana, but, whereas in the latter the white ground extends from side to side of the blade of the falls above the deep velvety tip, in the hybrid it is confined to a central triangular patch, irregularly spotted with deep violet. The leaves also differ in having only six ribs, while those of Bakeriana have eight.

Thinking that this plant was probably of hybrid origin, I grew a few bulbs of I. reticulata in a pot in order to get them in bloom early in the year, and crossed them in 1910 with pollen of I. Bakeriana. The seedlings were comparatively easy to raise, but, curiously enough, the first to bloom flowered last spring on the same day as Leichtlin's plant, and was to all intents and purposes identical with it. This year I have had some forty or fifty bulbs from this cross in flower, and I cannot too strongly recommend the cross to any who are interested in the reticulata group of irises. No two bulbs have produced identical flowers, and there have been many shades, both of blue and of red-purple. The unopened buds resemble those of I. Bakeriana in being spotted on the outside of the haft of the falls, and not merely lined as in I. reticulata. In all cases the triangular white patch is present, in some cases with a central orange streak, as in I. reticulata, but in others without this feature, which is also absent from I. Bakeriana. In a few cases the colour is an intense blue, almost the blue of Phacelia campanularia, which I do not remember to have seen elsewhere in irises.

The foliage is very sturdy, resembling that of I. Bakeriana rather than that of I. reticulata, and has six, seven or eight ribs.

It is to be hoped that the hybrid origin of these beautiful little bulbs will give them a vigour and a constitution which will enable them to resist the attacks of the fungous disease which so frequently attacks I. reticulata. Those who value the latter would, I think, be well advised to lift the bulbs about every second year and pick out any that show signs of disease, wash the sound bulbs in a solution of formalin, and replant fairly soon in fresh soil. There is one precaution that must be taken, and that is to see that the bulbs are thoroughly dry before they are put into the formalin. I have heard of bulbs being killed by the treatment, but I have never lost any myself from this cause, though I can well believe that a bulb that had just come soft and moist from the soil might easily absorb the formalin too deeply.

I. RETICULATA.

Why is it that the so-called type of I. reticulata, the well-known violet-blue form, is, so far as I know, never obtained from seed? As the years go by I have batch after batch of seedlings from the type, almost all without exception of a red-purple colour, and only occasionally a blue form, and then always of lighter blue than the type. The second generation also gives red-purples, and one could wish that the specialists in Mendelism would give their attention to what seems to be an interesting and complicated case of colour inheritance.

I. UNGUICULARIS.

In the past few months there have been several paragraphs in the horticultural press advocating the spring, and more particularly April, as the best time at which to move this well-known winter-blooming iris. I find that a French friend, who gardens within sight of the Mediterranean, and who can therefore use this iris as an edging and obtain masses of flower, agrees with me in dissenting from this view, and in preferring September for the operation of transplantation. Early in that month it will be found that fresh root-fibres are beginning to push out, and they will grow rapidly in the soil, which is then much warmer than it is in April, when growth is often entirely checked by frosty nights and dry, parching winds during the day. It is true that in a moist, genial April, followed by a warm and not too dry May, transplantation might be attended with complete success, but my own experience has been that the plants easily suffer from drought and from the cold dry winds.

My friend tells me that he finds that the white form comes true as to about thirty per cent. of the plants, though he does not tell me whether the plants were carefully protected from insects and pollinated with pollen of the white form only. The few plants that I have raised from the white form, when self-fertilised, have so far all been white, though it is true that the number is so small that this may be a mere chance. The variety speciosa, on the other hand, has, in my friend's experience, come quite true, and this confirms my own belief that this form is not Algerian but Greek. It differs structurally in having a ring of projecting knobs round the top of the perianth tube at the base of the segments of the flower. Here it never flowers till March or April, which is also the case with a minute form, which was sent to me from the island of Cephalonia.

I. ROSENBACHIANA.

The early form of this rare iris has once more flowered magnificently when planted out in a cold frame, which enables the foliage to develop uninjured in the early months of the year, and which also makes it possible to give the bulbs that absolute rest, warmth and drought in summer which seems essential to their well-being. I find that I was mistaken in thinking that this species rarely produces offsets, for this year in a fair number of cases two shoots have appeared where there was only one bulb last year, and moreover, the two shoots are equally vigorous and both produce flowers. Strong bulbs have produced three or four flowers from a single tuft of leaves.

It seems certain that there are two distinct forms of these species, for this year again the earlier form with yellow pollen is passing out of flower just when the first of the later form with white pollen are beginning to flower, and while the stout, nipple-like points of the majority are only just appearing above the surface.

It is difficult to see any difference except in the colour of the flowers and of the pollen. Colour alone would seem scarcely to warrant a different specific name, which was, however, apparently bestowed upon it under the title of I. baldshuanica by F. Fedtschenko in the "*Journal Russe de Botanique,*" 1909, *p.* 77. I am endeavouring this year to cross the two forms in the hope that seedlings may throw some light on their relationship.

Regelia Irises.

("*The Garden*"—*December* 14*th,* 1918.)

The name Regelia was given to a small group of Asiatic irises in honour of the late Dr. Regel of St. Petersburg, the Russian botanist to whom we owe the introduction to our gardens of many good plants from Central Asia.

The members of this group are not nearly as common in our gardens as they deserve to be, and this is probably due to the fact that they have been classed with the Oncocyclus Irises, which most gardeners have given up as hopeless in our moist climate. The Regelia Irises are, however, much more amenable to cultivation. The rhizomes increase rapidly under suitable conditions, and, moreover, seedlings are easily raised.

There is one essential point in the cultivation of these irises and that is that the plants must have a complete rest for two or three months in the late summer. This can be obtained by putting a temporary roof over their heads if they are grown in a position that lends itself to this treatment or by lifting the plants in July and not replanting them until October. The latter method is followed here, though I should prefer to leave the plants undisturbed and cover the beds with skeleton frames such as the late Sir Michael Foster used with such success at Shelford.

In choosing a position for these irises, it should be remembered that they require all the sun that our climate will give them and that a raised or sharply sloping bed will ensure that the soil about their rhizomes is at no time waterlogged. The soil should be rich in humus and plentifully supplied with lime.

The Regelia Irises are obviously closely allied to the Oncocyclus group, for the seeds of both groups are indistinguishable and yet quite unlike those of any other group of irises. They are remarkable for the possession of a kind of cream-coloured collar, which forms, as it were, the attachment between the seed proper and the placenta in the seed-vessel. The rhizomes of the two groups are very similar and characteristic, and the chief points of difference are that the Regelia species produce two or three flowers on each stem in place of the solitary flower of the Oncocyclus and that their beards are linear and do not consist of a broad patch of irregular scattered hair, such as is found in the Oncocyclus species.

The first Regelia Iris to be discovered was Bunge's I. falcifolia, from the deserts east of the Caspian. It is a small species with narrow, grass-like leaves and has never apparently been in cultivation. The next was the well-known I. Korolkowi, which was sent to St. Petersburg from Turkestan by General Korolkow. Of this iris there are many colour forms, but all are characterised by the conspicuous veining and by the dark beards, which, however, project so little on to the sharply reflexed blade of the falls as to remain practically hidden under the style-branches. In some specimens the ground is cream-coloured and the veining either olive-green or brown-purple. In others the ground is slightly suffused with purple, while in the variety concolor the whole flower is of a uniform red-purple colour with darker veins.

I. Korolkowi has a much more compact rhizome than that of I. stolonifera, of which the stolons are often much longer. Plants of this species are sometimes labelled Leichtlini or vaga, but stolonifera was the name first given and, moreover, accurately describes the habit of the plant. The flowers of stolonifera are very beautiful in some of its colour forms.

The edges of the petals are always waved, a character that has been transmitted to the hybrid with Korolkowi. The circumference is of some shade of brown-purple, while the centre has veins of the same colour on a blush ground, and the effect of this colouring is very remarkable. In some cases the veining is very dark and velvety, and I have one imported plant, which came by chance among a number of I. Hoogiana, of which the colour is wholly very rich dark blue-purple. One curious point about I. stolonifera is that the colour of its beard is apt to vary. In some years it is yellow in front and blue behind, while in others it is wholly blue. It is not yet known to what this change is due, but it is a phenomenon which does not seem to occur elsewhere among irises.

I. Korolkowi and I. stolonifera hybridise freely with one another and have given me some delightful forms, one of which is illustrated on *p.* 460 of " *The Garden,*" *December* 14*th*, 1918. It is distinguished by its conspicuous beard of deep blue, in which the deep tone of the beard of Korolkowi seems to have combined with the colour of that of stolonifera. The flower is of a curious and uncommon shade of red-purple. There is also in cultivation here a hybrid which Foster raised and called Korvag.

I. darwasica or Suwarowi is perhaps no longer in cultivation. It is a small plant, not unlike a reduced stolonifera, but distinguished by having all its petals tapering gradually to a point.

There remains only I. Hoogiana, the latest addition to the group and a truly magnificent iris. The stems grow to a height of more than two feet and produce large flowers of a uniform shade of blue-purple with bright orange beards. The shade of colour varies in different specimens and may be as pale as that of the palest I. pallida. The beard is broad and very conspicuous and tapers to a sharp point in front. About the whole flower there is an extraordinary appearance of refinement and breeding, and I. Hoogiana is certainly the most striking new species of iris. It is a vigorous grower, and although it is late in beginning to grow in the spring, it then grows so fast that it is at its best in May with the other members of the group. There is some hope, too, that its habit of lying dormant till winter is practically over may enable us to leave it undisturbed in the ground. Now that I have a large number of plants I certainly mean to try the experiment next year.

The Regelia Irises, and in particular I. Korolkowi, have been largely hybridised with Oncocyclus species to form the well-known Regelio-cyclus hybrids. These possess the vigour of the Regelias and something of the form and colouring of the elusive Oncocyclus species. Hybrids with bearded irises are less common, but I have a cross of Korolkowi both with a purple and with a yellow chamaeiris. Both are interesting and quite distinct. With I. stolonifera I have so far failed to obtain any pleasing hybrid. There are too many colour elements present, and the struggle between them results in a nondescript confusion and patchiness. Hoogiana gives promise of better results, but it is so beautiful in itself that it seems almost a pity to spoil its beauty in order to satisfy our curiosity as to how far its influence would prevail in a hybrid.

Regelia Irises and some Junos.

(" *The Gardeners' Chronicle*"—*June 23rd*, 1917.)

REGELIA SECTION.

May I give a warning to those who grow these beautiful irises? It is that the rhizomes should not be lifted until the root-fibres are fully developed. In early June it will probably be found that the foliage is beginning to show signs of turning yellow and that the tips of the new growths at the ends of the running stolons are showing through the ground. Until last year I always took this to mean that growth was mature and hastened to lift my plants before the main root-fibres sent out their lateral shoots. I was, however, always disappointed to find that the roots died away before planting time came in October, and that flowers were few in the following summer. Last year I left my plants in the ground until the middle of July, by which time growth was much more mature. The result was that the rhizomes and roots were in far better condition in October, and this season the plants flowered better than ever.

SOME JUNO IRISES.

The Juno section of irises is by no means a homogeneous group. There are at least two main groups, those with flowers of which the haft of the fall bears large wings which arch over and clasp the style-branch, and those of which the haft of the fall is strap-shaped and wingless. The seeds of the species of the two groups are very different, but our knowledge of some of the rarer species is still so scanty that it is impossible to say with certainty into how many sub-divisions these two main groups naturally fall.

It would be interesting if some geologist could tell us whether in the hills of Asia Minor the soil is a stiff clay, or at any rate that heavy red loam which is found in the limestone districts of Southern Europe and which seems to be extraordinarily fertile, and also whether there are not large tracts of sandy soil in Turkestan. These theories are deduced from the behaviour of various plants in this sandy soil in Surrey, and it would be interesting to know whether they are in accordance with facts. In any case, the fact remains that the Persica group of irises dies out here, such tulips as pulchella and polychroma are none too happy, and Fritillaria aurea refuses to live, while Iris bucharica grows like a weed, tulips such as Kaufmanniana are difficult to eradicate, and Fritillaria pallidiflora grows two feet high, with six or seven flowers on each stem. Of these plants, the former are all natives of Asia Minor, while the latter come from Turkestan.

Experience has therefore led me to abandon the western Junos and to concentrate on the Turkestan species, which have well repaid my interest in them. Last summer I lifted all my bulbs of Iris Rosenbachiana, and my belief was confirmed that there are either two species or two very different local forms concealed under this name. Dr. Fedtschenko has alluded to an Iris baldshuanica in the "*Journal Russe de Botanique*, 1909, *p.* 77, but as he only separates it from I. Rosenbachiana by saying that the flowers are yellow, it is difficult to be certain with what plant he was dealing. I would suggest, however, that the true Rosenbachiana is the early-flowering form with bright orange pollen. The thick fleshy roots on the dormant bulb taper gradually and are of a pale yellowish-brown. Here I have only one colour variety of this form, and the flowers have falls marked with a bright crimson-purple on a white ground. The latter form, which is probably Fedtschenko's baldshuanica, is very variable in the colour of its flowers and has given me one or two seedlings of a pale creamy-yellow marked with brown-purple. This form has white pollen, and the roots taper much more abruptly than do those of the true Rosenbachiana and are of a white colour. I found when dealing with large numbers of bulbs that I could separate them into the two species by the colour and formation of the roots.

Perhaps the most striking and certainly the most vigorous of all the Juno Irises is I. bucharica, with white and yellow flowers. Here it has combined with the yellow I. orchioides and given me wholly yellow forms, with the vigour and size of bucharica. One chance seedling of bucharica has come wholly white except for a pale yellow crest and in others the deep yellow of the type is replaced by a pale, delicate lemon-yellow, which gives a beautiful effect. I. bucharica also crosses readily with I. warleyensis, and many different seedlings have recently been in flower here. The style-branches and the standards are usually tinged with blue, and the blue of warleyensis contends with the yellow of bucharica to produce much variety in the markings of the falls. Sometimes these are yellow with a greenish tinge at the edge, sometimes the blue-purple only appears as blotches on the yellow, and sometimes there is little trace of the influence of warleyensis on the falls at all.

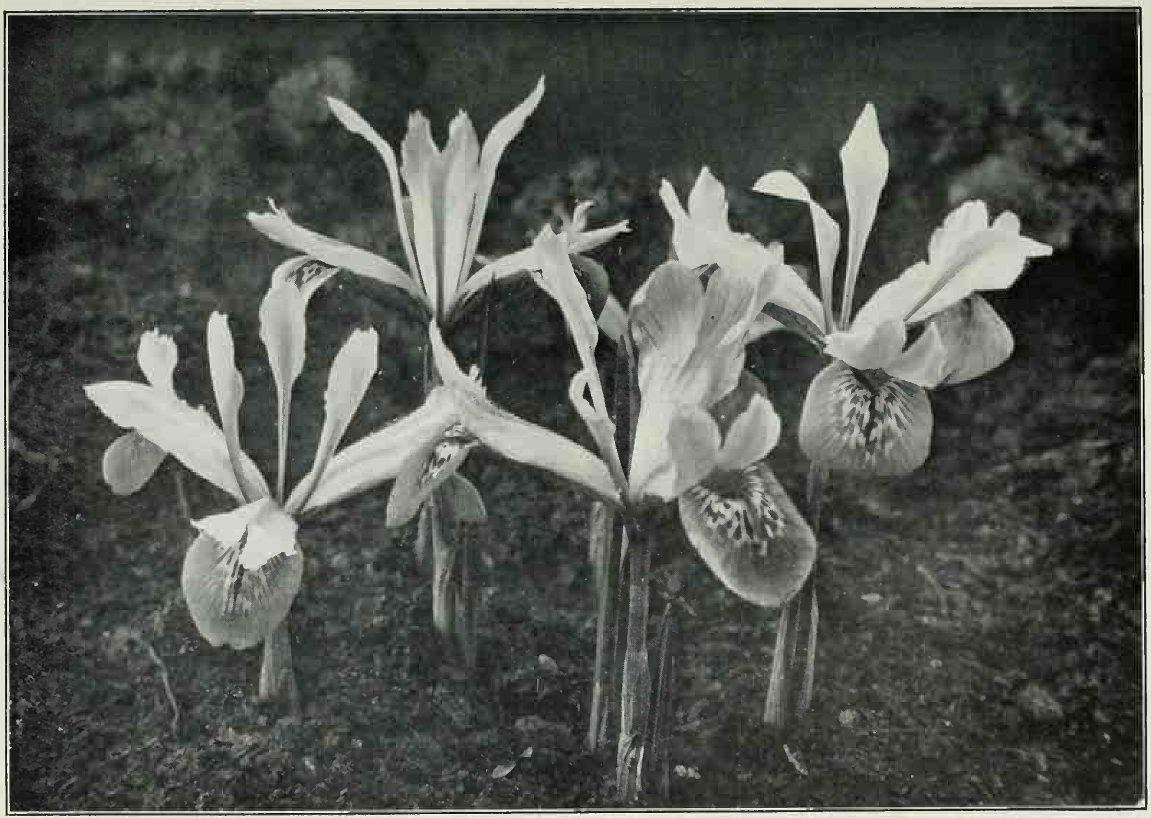
Iris warleyensis grows well here, but never with the vigour of bucharica. It has also given me a variety of seedlings, including a white form which retains the orange-coloured crest of the type, and pale yellow forms which also retain this feature.

Iris orchioides is rich in colour but the flowers are small and insignificant in comparison with those of I. bucharica. Seedlings vary a good deal, some having conspicuous bright green markings on the golden ground, some are of a pale sulphur-yellow, while others are wholly white or white with yellow crest.

My failure to keep Tubergeniana and Willmottiana, both of which come from the neighbourhood of Tashkent, in Turkestan, and have winged falls, makes me wonder whether there is not in that district a region of the heavy soil in which this kind of Juno Iris appears to revel. Yet, the various crosses between sindjarensis and forms of persica, which Van Tubergen has raised at Haarlem, presumably in the sandy soil of the bulb garden, dwindle away here.

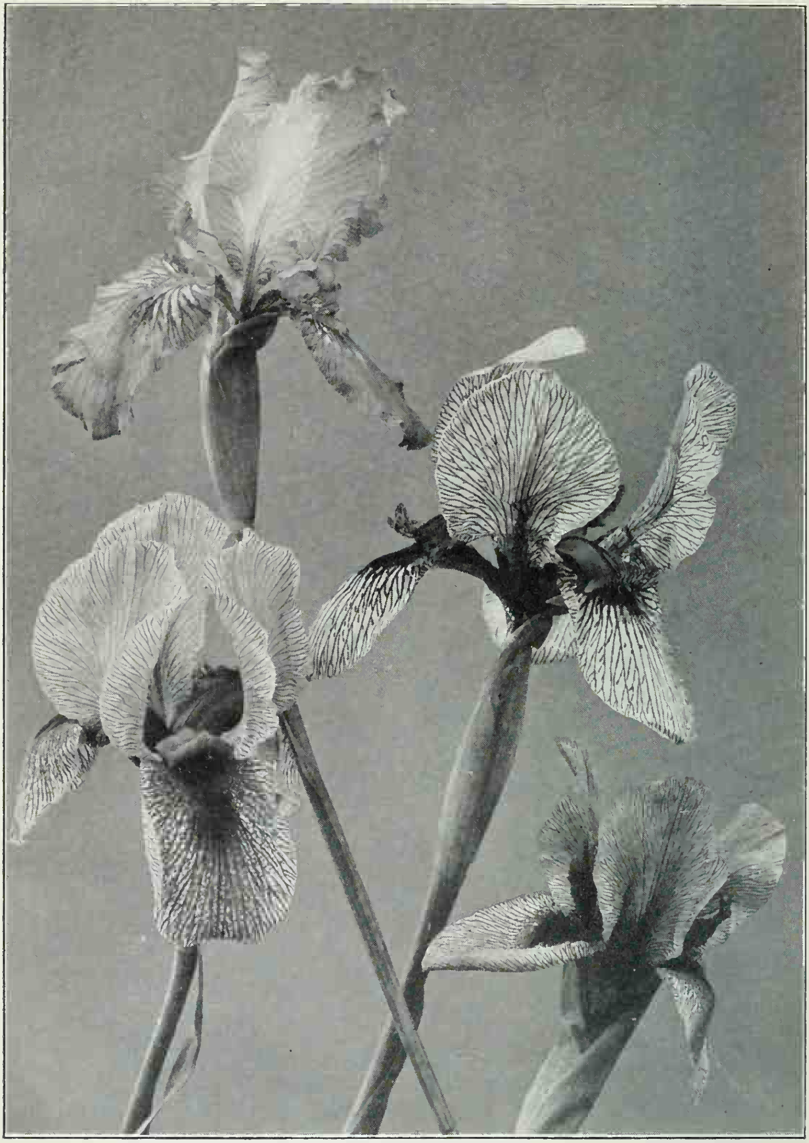
The lifting of a number of bulbs of Juno Irises is most trying to the temper, even in the lightest of sand. In heavy soil, baked hard in summer, it must be so disheartening that no gardener except the most callous could persevere with it. The slightest jerk or twist snaps the fleshy, brittle roots or detaches them bodily from the base of the bulb. It is true that clusters of roots thus detached do develop buds in the course of time, but I have yet to find that these ever develop into vigorous bulbs.

I. bucharica seeds here abundantly and seedlings are easily raised in pots sunk to the rim in the open. The seeds must be sown soon after they ripen, or germination will be unsatisfactory. At the end of the first summer the small bulbs may either be left a second year in the same pots, if the latter are large and the soil rich, or sifted out and planted in September in beds in which they will flower two or three years later.



IRIS HISTRIOIDES

See page 1 and index



IRIS REGELIO-CYCLUS

Hera **Massilia**
Hecate **Terpischore**

See page 5 *and index*

Iris Rosenbachiana.

(" *The Gardeners' Chronicle*"—*April 18th,* 1914.)

This gorgeous iris is unique in more ways than one. To the botanist it is interesting because its seeds are entirely unlike those of any other iris in cultivation, while the gardener's curiosity and astonishment are aroused by the great development of the fleshy roots, which are usually four or five in number and often as large as the bulb itself. In the upper parts they are very thick, then suddenly decrease in diameter and end in a long, thin thong. No other Juno Iris is known to possess roots so large in proportion to the size of the bulb.

Gorgeous seems to be the word that we must apply to this iris when we see a sun-lit group of the brightly-coloured flowers standing out against the sombre background of the bare earth, for the leaves are so immature at flowering-time as hardly to attract the eye at all.

Early in the new year, broad, nipple-like shoots with a whitish, membranous sheath begin to burst through the surface of the ground. Soon the tips of the leaves appear through the sheath, and then suddenly, often almost in one night, the flowers shoot up and open, if the sun appears only for a few minutes.

There are, I am convinced, local forms of this iris, the peculiarities of which are preserved by at least the first generation of seedlings. There is an early-flowering race with yellow pollen, and so far as I know, few colour variations, and a later race of which the pollen is white, and of which hardly any two plants produce flowers of the same shade of colour. For the last month I have had in flower between twenty and thirty seedling plants of the earlier kind. Each flower lasts a week or more, and as each bulb throws up two or three flowers in succession a group of these irises is a lasting pleasure. It was certainly disappointing to find so little variation in colour among these seedlings, for, although it is true that minute differences were numerous—for instance, the " standards " were either horizontal or drooping ; some pointed, others broad and obtuse—the general effect was uniform.

The strap-shaped falls have along the haft, flanking a yellow or orange central ridge, either four or six crimson-purple veins on a silvery-white ground, which is often slightly suffused with a pale red-purple. On the blade the central ridge becomes a crest and is sometimes irregularly dotted with crimson-purple. It is surrounded by a large patch of the same brilliant colour, which covers all the blade of the falls with the exception of the tip, which is a pure white. The large overlapping crests of the style-branches are either white or white faintly flushed with red-purple, and the standards are of the same colour. The style-branches have a central band of pale red-purple changing to yellowish at the base on a silvery-white ground. The flower measures three or four inches across and is raised on a long perianth-tube of a yellowish-purple colour, rising one to three inches above the top of the spathes. In the only other colour form of this early variety that is known to me the silvery-white ground is replaced throughout by a pale red-purple.

On the other hand, the later race is extraordinarily variable. The plants begin to come into flower just when the last flowers of the earlier race are fading. All the shades of both blue and red-purple occur, and yellow flowers, though rare, are not entirely unknown. The blooms are perhaps rather smaller than those of the earlier race, and the plant seems to be less vigorous.

My experience is that I. Rosenbachiana makes very few offsets. A flowering bulb is only obtained from seed after four or five years of growth. It then flowers regularly for three, four or even five years, after which it either dwindles away or dies outright. Fortunately, however, this iris seems to be peculiarly well adapted for easy fertilisation. The stigmatic surface is larger and more prominent than in most, if not in all, other irises. The anthers also are large, and the pollen very abundant. Seed sets readily if the flowers are cross-fertilised one with another, and provided that the plants are given some shelter from heavy rain. I have counted as many as eighty or ninety seeds in a single capsule, and their very number may be an indication that it is a plant which must be continually raised from seeds. The latter should be sown at once in pots plunged in the open, and may be sown very thickly, for only a few germinate each year. Each summer the minute bulbs and the remainder of the seeds must be sifted out, and the latter re-sown at once. The young bulbs do best planted out under the protection of a cold frame.

Owing to the nature of the root-stock this iris must be extremely difficult to collect satisfactorily in the wild state from the hard sun-baked soil of the steppes and mountain slopes of Turkestan. Consequently we must usually rely on home-raised seedlings to replenish our stock. If, therefore, anyone who sees these notes has specimens of this iris, I would suggest an exchange of seeds or bulbs in order that, by cross-fertilisation, we may be able to keep it in cultivation.

Iris Rosenbachiana.

(" *The Garden*"—*August* 18*th*, 1917.)

This fine iris certainly deserves all the praise that Mr. Goodwin bestows upon it, though, except in sheltered gardens, it will probably be found to succeed better in a cold frame than in the open border. It is well worth raising from seed, and a whole frame in full flower in February and March is a cheering sight.

There are certainly two distinct forms and probably two species concealed under the name of Rosenbachiana ; one, the first to come into flower, has yellow pollen and brownish roots, while the other has white pollen and whiter roots. This latter is probably the I. baldshuanica of Fedtschenko. These two irises are widely separated, both by their seeds and by their strap-shaped falls, from the stemless Junos of Asia Minor, such as the various members of the persica group, all of which have winged falls, like I. alata.

I. Danfordiae is not a Juno Iris at all, but belongs to the reticulata section. It was first described from dried specimens, on which the outer reticulated coats are not very apparent, and was classed as a Juno because the standards are reduced to mere points—a character which is typical of the whole Juno section.

The seeds, the leaves and the netted bulbs without roots in the resting state show at once that it is not a Juno Iris, but a relative of I. reticulata. One difficulty in its cultivation seems to lie in the fact that the bulb after flowering does not, like I. reticulata, split up into a few bulbs, one or two of which will flower the next year and the rest the year after, but forms at its base a large number of minute bulblets, no bigger than grains of wheat, which need careful nursing in heavy loamy soil if they are to develop into flowering bulbs.

Iris Rosenbachiana.

(" *The Garden*"—*March* 22*nd*, 1919.)

It is a pity that this iris is so scarce and so little known, for it is not only one of the earliest to flower in the new year, but also one of the most gorgeous of all. It must be confessed at once that it does not do itself justice unless it can have a roof over its head when in flower ; but then, what flowers have we that can withstand the weather in January? Frost it can stand with impunity, and though, when the ground was frozen solid a few weeks ago, the development was temporarily checked, the plants are now (March) as happy and the flowers as numerous as though we had no frost at all. My own plan is to grow the plants in cold frames through which air circulates freely at all times. Years ago, when I first saw the flowers of I. Rosenbachiana, I vowed I would not rest until I had a whole frame full of specimens, and now that I have several frames full of flowering bulbs of this iris I do not regret my vow. All my present plants have been raised from seeds here, and as seeds are sown every year, fresh plants come into flower every year, so that the length of the period of four or five years that elapses between the sowing of the seed and the first flowering of the bulb is no longer realised.

The bulbs of I. Rosenbachiana need careful handling, for each should have attached to its base four or five long store-roots, which are swollen into tubers almost as large as the bulb itself. They should be planted early in the autumn in rich, light soil not deficient in lime. The apex of the bulb should be about two inches under ground and the lights can remain off the frames until the thick shoots begin to break through the surface early in January. Once the soil is pierced, development is extraordinarily rapid, and the tips of the leaves are barely more than an inch above the soil before the first flower has developed. Each individual flower lasts a week or ten days, and as strong bulbs produce three or four flowers in succession, the display is spread over a considerable period. The flowers are stemless, and the ovary is quite sessile in the axils of the leaf, as in other Juno Irises. The flower is raised on a dark purplish-brown tube three inches or four inches in length, which carries it well above the foliage.

The most conspicuous parts of the flowers are the large crests of the style-branches, which stand almost erect above the strap-shaped falls. As in all the Juno Irises, the falls and the standards are, as it were, inverted, so that the latter extend horizontally or even hang down, while the former arch high above them.

If I. Rosenbachiana ever became a florist's flower—a fate which will probably never befall it—there would be no end to the series of named varieties, for each seedling seems to differ from its fellows in its colouring. In every one there is the contrast between the particular shade of blue-purple or red-purple and the gold or orange of the prominent crest. The ground colour is either white or a pale bluish-grey more or less suffused with a pale shade of the purple, which is most intense on the blade of the falls. This patch of vivid colour sometimes covers the whole blade, but more usually the tip is much paler or even white. In rare cases the purple is almost wholly absent and only occurs in the veins on the haft of the falls, the rest of the flower being a pale creamy-yellow.

It is possible, though not certain, that under the name of I. Rosenbachiana we have also in cultivation a second species, I. baldshuanica. Further supplies of collected bulbs from Russian Turkestan could alone help to settle the question, but my impression is that there are either two closely-allied species, or, at any rate, well-marked local forms. The earliest-flowering forms have golden pollen and gradually tapering roots of a pale brown colour, while the later-flowering forms have white pollen and more abruptly narrowing roots of a whiter colour. Among my own plants I am afraid there are now hybrid intermediate forms, so that I have little hope of settling the question without fresh material.

Iris Rosenbachiana.

(" *The Gardeners' Chronicle*"—*February 6th*, 1915.)

Will anyone who grows this iris and who is willing to exchange either pollen now or bulbs later be so good as to communicate with me ? I have a frame full of seedling bulbs of this species of which a dozen or more are already in flower. I am, however, disappointed to find that the colour scheme is in every case the same, namely, dark red, white and gold. I am anxious to obtain different colours, which can probably be done by cross-fertilisation.

Spanish Irises.

(" *The Gardeners' Chronicle*"—*October 11th*, 1913.)

It is astonishing that the majority of gardeners should be content to grow plants year after year in their gardens without wishing to know whence they come or how they have been evolved. Every gardener knows the so-called Spanish Irises, but who can produce specimens of the wild plants from which they have been bred? It is easy to say that they are the hybrid offspring of Iris xiphium, but can any English garden show us specimens of a form of I. xiphium which could conceivably have produced them? Investigations have so far only pointed to negative results, and it would be extremely interesting if this note led to the discovery that the plants for which we are in search do after all exist in an English garden.

In order to narrow the field of investigation we may first deal with the suggestion that Spanish Irises are of hybrid origin. By this we should mean that they have been produced by crossing two species, not by breeding together the various colour forms of one species.

There are six known members of the xiphium group of Irises, I. xiphium itself and I. xiphioides, I. tingitana, I. filifolia, I. juncea and I. Boissieri. Of these I. xiphioides stands by itself, and differs from the others in the shape of its segments, and by its capsules and seed. None of its peculiarities ever appears among Spanish Irises, and it may, therefore, be excluded as a possible progenitor. Of the remaining species, I. xiphium differs from the other four in the structure of the perianth tube. In I. xiphium, the short broad, funnel-shaped tube is set immediately on the ovary, but in the other four species there is between the ovary and this broad funnel a linear tube, which we may look upon either as its prolongation or as an elongated neck of the ovary.

In this connection it is interesting to remember that the same formations of perianth tube and ovary occur also in the Spuria group, whose members bear other striking resemblances to the xiphium species, *e.g.*, in the shape of the segments of the flowers and in the arrangement of the lateral branches on the stem, which occur, though rarely, on strong-growing forms of I. xiphium. Thus, I. graminea may be compared with I. xiphium, for in each case the ovary expands abruptly into the broad, short tube, while I. spuria and I. Sintensii both exhibit that tubular elongation of the ovary at its upper extremity which occurs in the majority of xiphium species.

If Spanish Irises numbered among their ancestors any of the species tingitana, Boissieri, filifolia or juncea, which are all characterised by this tubular elongation of the neck of the ovary, we should expect to find some traces of this character among them. Indeed, I am inclined to believe from the evidence of an undoubted cross between I. xiphium and I. tingitana which was raised by the late Sir Michael Foster, and which resembles I. tingitana in all respects and has the additional advantage of being hardy and floriferous without special treatment, that the presence of the neck to the ovary is dominant over its absence.

We are forced, therefore, to conclude that the Spanish Irises must have been evolved from I. xiphium, taking the name also to cover the yellow-flowered forms which were described under the name of I. lusitanica. But the difficulty then arises that I. xiphium in the wild state seems to flower much later than our Spanish Irises. It has been found to flower as late as August and September on the Sierras del Pinar and de Cazorla in Southern Spain, while even at sea-level on the south coast of France it is in full flower on July 1st. I have specimens in cultivation from the neighbourhood of Béziers in the Department of Hérault, and others which resemble them in all respects from Portugal and both were recently in flower here on July 15th. At the other extreme we have the abovementioned hybrid of xiphium and tingitana, which flowers in April, and the hybrids of the pseudofilifolia of trade catalogues, which flower in the middle of May, a full fortnight or more earlier than ordinary Spanish Irises. The origin of the false I. filifolia is a mystery, but its offspring are both too large and vigorous and too early-flowering for it to be a parent of Spanish Iris. The only wild form of xiphium that flowers here with the Spanish Irises comes from Algeria, and the flowers are of a shade of blue that I have not seen elsewhere. In other respects it much more closely resembles our idea of the wild parent of the Spanish Irises than any other form of I. xiphium. Does a similar form exist in Spain, or is this one more case in which one of the commonest plant names in our garden bears little relation to truth?

Spanish and Dutch Irises.

(" *The Gardeners' Chronicle*"—*July* 13*th*, 1912.)

In an article on Iris filifolia, which appeared in "*The Gardeners' Chronicle*" *for September* 23*rd*, 1911 (*p.* 218), I mentioned the fact that it was not the true I. filifolia but another plant which often appears under this name in catalogues and which might more appropriately be called I. xiphium praecox from its early-flowering habit, that was one of the parents of the hybrid "Dutch" Irises. I went on to say that the statement that all the known species of Spanish Irises were combined to produce these Dutch Irises was probably erroneous, for not one of them shows any trace of perianth tube, which would almost certainly have appeared sooner or later if either I. tingitana, I. Boissieri or I. juncea had been among the parents. I am sorry that this statement should have seemed to question the accuracy of the raiser's account of the origin of these hybrids, and it would doubtless have been more correct if I had said that none of the hybrids that I had seen showed any trace of any other parent than I. xiphium and its varieties praecox and lusitanica.

Mr. C. G. Van Tubergen, of Haarlem, the raiser, has assured me that the pollen of both I. tingitana and other species was used to fertilise the pseudo-filifolia or xiphium praecox. This statement I do not wish to traverse, but I am afraid I must still maintain that, except possibly in the shape of the blade of the falls and in the soft blue colouring of some magnificent flowers that Mr. Van Tubergen recently sent me, I have failed to find any trace of that structural difference which separates all the other species from I. xiphium. The difference is found in the perianth tube. In I. xiphium this is very short and funnel-shaped, and as the flower withers, often breaks off from the top of the ovary with the withered remains of the segments. In all other species, this short funnel-shaped upper end of the tube is separated from the ovary by a narrow, linear tube half an inch or more in length, which even when withering clings much more closely to the ovary.

None of the Dutch Irises that I have seen shows any trace of this linear perianth tube and Mr. Van Tubergen admits that he has found no trace of it among his stock. This is the more curious because I had in flower this year a few plants of a cross of I. xiphium and I. tingitana, which we owe to the skill of Sir Michael Foster. In this hybrid a linear tube of over half an inch is present, showing apparently that in the first generation of hybrids the presence of the linear tube is a dominant characteristic.

It had occurred to me that the seed parent might possibly have been I. tingitana, but Foster certainly called the hybrid I. xiphium *x* tingitana in a letter addressed to me not many weeks before his death. Another fact that tends to prove that I. xiphium was the seed parent is that the hybrid flowers freely every year, and that the buds do not succumb to late spring frosts, after the annoying fashion of those of I. tingitana, when the bulbs of the latter have at last been induced to flower.

This year both I. tingitana and I. xiphium *x* tingitana were growing here almost side by side and were in bud early in April. Then came the sharp frosts that played such havoc with the undeveloped flower shoots of I. germanica and caused large clumps of this species to remain apparently flowerless, though the frost-bitten immature flower stems could be dissected out of the bases of the tufts of leaves. These frosts killed the buds of I. tingitana entirely, but left those of the hybrid unharmed, so that they opened on April 13th, which must surely be almost a record for a Spanish Iris flowering unprotected in the open.

The question of the date at which Spanish Irises flower is very curious. Only to-day (July 3rd) I have received from the south of France a few bulbs of what must probably be one of the last remaining colonies of I. xiphium that still survive in the wild state in France. These were found in flower on June 30th, quite close to the Mediterranean on the coast of Hérault, although it was supposed that the extension of the vineyards right down to the seashore along that coast had exterminated the colonies of I. xiphium that used to grow there. It might certainly have been expected that I. xiphium would have flowered a month or two earlier in such a warm locality, for with regard to other irises, the month of April there corresponds to June in the south of England.

The fact that the wild I. xiphium may flower so late, even in such a locality, tends however, to show that it is unwise to separate from that species such Spanish plants as have been described under the names of I. serotina, (Willkomm) and I. Taitii (Foster). Willkomm's name of serotina was given to a plant which was found in flower in August and September. Herbarium specimens also show that I. xiphium can be obtained in flower in August and even in September at a height of over five thousand feet on the Sierras de Cazorla and del Pinar in the south of Spain. I. Taitii has been in cultivation here for several years now and flowers at the end of June or early in July.

In spite, however, of the existence of these late-flowering forms of I. xiphium, I cannot admit that the early-flowering character of a hybrid is evidence that its parents were species other than I. xiphium. Several hybrids of I. xiphium praecox, crossed with pollen of I. lusitanica, which is only a yellow-flowered form of I. xiphium, certainly flower a week or two before either of their parents with the first of the Dutch Irises, with which they seem to be identical.

It is an interesting speculation to try to discover the nearest point of contact between bulbous and rhizomatous irises. It seems not impossible that this may be found in I. xiphium and I. spuria. The form of the segments of the two flowers is identical, the spathes are not dissimilar, and when, as sometimes happens in strong growing examples of I. xiphium praecox and of hybrids raised from it, a lateral flower develops on a short vertical branch, the resemblance to I. spuria is particularly striking.

That I am not alone in seeing the resemblance between I. xiphium and I. spuria is proved by the fact that some years ago I was informed that flowers of I. hyerensis were on their way to me from the south of France. Imagine my surprise when, on opening the box, I found a number of fine flowers of I. tingitana which had been picked and sent to me by mistake for I. hyerensis. The latter, by the way, is nothing but a cultivated form of I. spuria, in spite of its reputed origin from a cross between a Kaempferi hybrid and I. xiphioides. It is probably only one more example of the process which is continually going on in any collection of irises, and by which self-sown seedlings of such self-fertilised species as I. spuria, I. pseudacorus, I. versicolor or I. setosa (Hookeri) come up where other seeds have been sown and have failed to germinate or where other and rarer species have failed in the struggle for existence.

Iris Sintenisii.

(“ *The Gardeners’ Chronicle* ”—*August 3rd*, 1912.)

For several years past I have been trying to obtain living specimens of this interesting iris, which was first described by Janka from specimens collected by Sintenis in the Dobrudja district on the western coast of the Black Sea, to the south of the mouth of the Danube. My nearest approach to success was in 1910 when I found in M. Philippe de Vilmorin’s garden at Verrières le Buisson, an unnamed garden iris which I felt sure must be I. Sintenisii, even though my visit was in August and the plants had subsequently long since flowered and were only bearing seed vessels. Through the kindness of M. Philippe de Vilmorin, I received a specimen of this iris, which flowered this year, and proved to be the species in question. By a curious coincidence there were also sent to me this year flowering specimens of the same iris from the neighbourhood of Manduria in South-eastern Italy, and others from the Asiatic shore of the Bosphorus.

The foliage of this iris consists of somewhat close tufts of narrow, almost linear, glaucous-green leaves of the same height as the stem, which is about a foot long, but which is liable to be either longer or shorter by as much as three inches. The stem bears only a single terminal head of two flowers and the flowers closely resemble those of the small European forms of I. spuria, being in shape not unlike a small slender I. xiphium. The falls have a small, almost round blade, separated by a narrow constriction from the long oval haft, and are closely veined with dark blue-purple on a white ground, which is indeed wholly obscured on the outer parts of the blade. The upright standards are of approximately the same shade of dark blue-purple.

The interest in this specimen lies in the fact that it apparently forms a connecting link between I. graminea and I. spuria. The characteristics of I. graminea are the curiously flattened stem, with its single terminal head of two flowers, the absence of any long tapering neck to the ovary and the glossy upper surface of the leaves. On the contrary I. spuria has a round stem, which bears one or two lateral, upright branches, in addition to the terminal head, and has also an ovary with a long, tapering neck, which, indeed, is often mistaken for the short, broad tube into which it suddenly expands at the apex. The foliage is slightly glaucous on both surfaces. I. Sintenisii agrees with I. spuria except in the fact that it has only the single terminal head of the two flowers, as in I. graminea, and in one other curious feature. This is found in the spathes, of which both valves are sharply keeled, while in the case of I. spuria only one valve is keeled and that only for part of its length. In this feature, I. Sintenisii agrees with I. graminea.

When we come to consider the distribution of I. spuria and I. Sintenisii, we are struck by the fact that their areas coincide very largely with those of two other species, widely separated in the Iris genus from the Spuria group, and differing chiefly in the presence or absence of the sharp keel along the back of the spathe valves.

The form of I. spuria which I. Sintenisii most closely resembles is that which grows in the marshes between Hyères and the sea, in close proximity to that form of I. chamaeiris which grows (or grew, for I failed to find it last year, although plants were found for me a few years ago) on the Domaine du Ceinturon, and which was described under the specific name of

I. olbiensis. I. chamaeiris has one of its spathe valves, and one only, slightly keeled, but in the Balkans there is a corresponding species with both valves sharply keeled, namely, I. Reichenbachii. Of this species the purple and yellow forms masquerade in some gardens under the names of balkana, bosniaca, serbica, macedonica, Skorpili, and others, but there seems to be no doubt that just as I. chamaeiris varies in colour in the south of France and in North Italy, so also does I. Reichenbachii vary in the Balkans. It is, moreover, interesting to note that I. spuria and I. chamaeiris agree in the possession of but slightly keeled spathes, while their relatives in the Balkans, I. Sintenisii and I. Reichenbachii both have sharply-keeled spathes.

" CRIMEAN " IRISES.

In connection with the above-mentioned synonym of I. chamaeiris, namely, I. olbiensis, it would be interesting to know whether the name gives us the clue to the puzzling question : " Why are garden forms of I. chamaeiris often catalogued as Crimean Irises ? " On the other hand, a possible explanation is that the town of Olbia, which once stood near the site of the present Hyères, and after which this form of I. chamaeiris was named, has been confused with the far more famous town of the same name near the mouth of the Dnieper, in close proximity to the Crimea. On the other hand, it is, of course, possible that the name " Crimean " came to be applied because it was thought that the dwarf irises in question were hybrids of I. pumila, which grows, as a matter of fact, near Odessa, and probably also in the Crimea itself.

Iris Snow Queen.

(" *The Garden* "—*November 9th,* 1912.)

It would be interesting to know whether the writer of the note on Iris Snow Queen on the first page of the issue of " *The Garden* " *for November 2nd,* has any evidence for his belief that the plant is a hybrid. I should like to put forward the view that this fine iris is merely the albino form of the Iris orientalis of Thunberg, which is probably a good species and entirely distinct from I. sibirica. It is possible that the two plants merely represent different combinations of pairs of Mendelian characters, but this possibility has still to be proved.

All that appears to be proved at present is that I. sibirica has tall stems, raising the flowers well above the foliage, and produces heads containing three, four or five flowers on pedicels of increasing length. The capsules are short, broad and bulging, and contain large, flat seeds. I. orientalis, on the other hand, has leaves which, if held erect, are as long as, if not longer than, the stems, of which the terminal head rarely contains more than two flowers on comparatively short pedicels. The capsules are long and narrow, triangular in section, and contain small, thick, almost cubical seeds.

As regards the actual flowers, those of I. sibirica are distinctly smaller than those of I. orientalis, and, moreover, the almost orbicular fall-blades of the latter are extended nearly horizontally, while those of I. sibirica hang perpendicularly. Of both these irises albino forms occur, among which there are individual differences both in vigour and in floriferousness. Snow Queen, the albino form of I. orientalis, breeds true to the white colour, and is a recessive for the colour factor. If the type and the albino form be cross-fertilised, some very beautiful forms of a bright sky-blue colour can be obtained, of a shade that I have not seen elsewhere among irises.

It is not quite certain how the name of I. sibirica came to be applied to a plant which seems to be confined to Central Europe and Russia west of the Urals, but the evidence of herbarium specimens seems to prove that I. sibirica does not extend east of this line, and that I. orientalis is not found west of the neighbourhood of Nertchinsk in Manchuria, whence it extends through Corea into Japan.

Iris Spuria.

(" *The Gardeners' Chronicle* "—*September 7th*, 1918.)

It has been long apparent that the name of spuria covers a number of local forms of an iris which is widely distributed over Europe, and, indeed, in Asia. Herbarium specimens are of small value in comparing the various forms, for the growth of the different plants varies considerably according to the conditions of soil and climate in which they are grown, and, moreover, the same plant may differ appreciably from one season to the next, as conditions of heat and moisture are seldom identical in two consecutive years.

It has at length become possible to obtain plants from most of the known European habitats of this species, and to grow them side by side under conditions much more nearly identical than those in nature. It cannot be certain that this comparison is entirely satisfactory, for there still remains the possibility that some of these forms vary from seed, and that the one or two plants collected in any locality were therefore representative of only one of the forms to be found in that district. However, bearing in mind this possibility, which can only be investigated by raising a number of seedlings from each locality, the various local forms seem to fall into three groups.

1. The plants are dwarf and slender, and usually produce only two flowers. The reduced leaves on the stem are narrow and tapering, and entirely clothe the stem. This form is found near Agde, in the Department of Hèrault, in the south of France, near l'Hermenault in Vendée on the west coast of France, and near Madrid.

2. The plants are stouter and slightly taller than those of the first group, and the stems produce one or two lateral flowers set close below the terminal head. The reduced leaves are broader and less gradually tapering, but in this group, too, they entirely clothe the stem. Specimens of this form are found in the marshy meadows between Hyères and the Mediterranean, on the Danish island of Saltholm, in one locality in the fens of Lincolnshire, and near Algiers. I have not myself visited the habitat in the fens, but there seems no doubt that the plant is really wild there, though it was unknown to Bentham and Hooker.

3. The third group consists of taller plants, with the clusters of flowers and the reduced leaves set much further apart on the stems, so that the internodes are always uncovered for some distance. This form occurs at Trebur, near Darmstadt, and also near Perth, and in Hungary, and it is presumably the same form that was named sub-barbata by Joo.

There is practically no variation in the actual flowers, though the shade of blue differs a little in different specimens.

So far as my experience of the plants goes, I should be inclined to expect that seedlings of groups 1 and 2 might be found to be indistinguishable, or to contain specimens of both forms, but that 3 would remain distinct.

Iris sulphurea (Koch).

(" *The Gardeners' Chronicle* "—*November 18th*, 1911.)

This interesting iris was described as long ago as 1848 (C. Koch in " *Linnaea*," *xxi*., 1848, *p*. 637), but has suffered from an unfortunate mistake by which its name was reduced to a synonym of De Candolle's I. flavescens (" *Redouté Liliaceae*," *p*. 375). The latter iris is well-known in gardens as a pale, yellow-flowered, bearded iris, which flowers in May shortly after I. germanica. The confusion of the two plants doubtless arose from the statement of De Candolle that Redouté's figure represented an iris from the Caucasus. This statement is unsubstantiated, and gives the impression that it was not based on any accurate information, an impression which is strengthened by the fact that no wild specimens of this iris appear to have found their way into herbarium collections. Moreover, repeated attempts to self-fertilise, or even to fertilise, I. flavescens have so often resulted in failure that we are led to suppose that it is really only a garden hybrid of unknown origin.

Two years ago I was fortunate enough to receive from the Caucasus some seeds and a couple of plants under the name of I. flavescens. These latter and six or eight seedlings have flowered this year, and there is no doubt that we have here a totally distinct iris. The leaves are of a bright, yellowish-green, with a glaucous bloom, and die away altogether in winter. The first new leaves of each tuft have very blunt, obtuse ends and a distinctive feature is the conspicuous white edge, which is particularly noticeable where one leaf crosses another.

The stem is not much more than eighteen inches high, and the lowest flower barely overtops the leaves, indeed, it is sometimes concealed among them. The inflorescence consists of a terminal head of two flowers and two side branches, each set in a large inflated bract-like leaf, and bearing a single flower. The colour is a pale, sulphur-yellow, and the bases, both of the standards and of the falls, are veined with greenish-brown. The beard is bright orange-yellow.

The whole habit and appearance of the plant distinguish it at once from I. flavescens, and a very conspicuous difference is found in the spathes. In I. flavescens these are nearly wholly scarious when the flowers open, whereas in I. sulphurea they are wholly green, inflated and of a curious membranous texture. Moreover, the plants set seed fairly readily when self-fertilised and form large capsules, tapering to a conical point above and almost circular in section.

The iris just described seems to agree in all points with the specimen of I. sulphurea described by C. Koch, and collected by K. Koch on the lower slopes of the Caucasus shortly before the middle of the last century. This specimen I was fortunate enough to find lately in the herbarium of the Berlin Botanic Garden, and I have no doubt as to its identity with my Caucasus plants.

Of iris names there are already so many that any additions are unwelcome, but in this case the rehabilitation of the name I. sulphurea seems to point not to an increase but to a reduction in the total number of species. Close observation of specimens of I. Talischii (Foster), and of I. obtusifolia (Baker), and of seedlings of both of them and comparison with I. sulphurea have led to the conclusion that all three names refer to the same plant. This conclusion is hardly surprising when we remember that sulphurea comes from the Caucasus and obtusifolia from Mazanderan, the Persian province on the southern shore of the Caspian, while Talisch is situated on the west shore of the Caspian, half-way between Mazanderan and the eastern end of the Caucasus range. The net result, therefore, is that we are able to set up I. sulphurea as a good specific name, and reduce to synonyms of it both obtusifolia and Talischii.

Iris Straussii.

(" *The Gardeners' Chronicle*"—*June* 19*th*, 1909.)

I should like to draw attention to a good example of this plant, which I received from Mr. W. Muller, of Nocera Inferiore, Italy, with a note to the effect that it was collected in Persia, on the borders of Baluchistan. The first flower opened on April 22nd, and agreed with the description given in Mr. Lynch's "The Book of the Iris" except that the head consisted of three flowers within the same outer spathe valves.

Curiously enough, within a few days, a seedling bloomed for the first time and was identical with this Persian I. Straussii. It was a plant that I raised from seed of a yellow iris offered in the trade about four years ago as I. suaveolens. Among a dozen plants, four came clear yellow and three others had the curious dull purple of I. Straussii. Of these latter, two had beards, in which the yellow-white hairs of the beard were not tipped with blue as in I. Straussii.

All these plants agree in having standards that are noticeably larger than the falls and which project beyond the falls in the unopened bud. The texture of the segments is extremely delicate in all cases, quite unlike that of the European pumila or chamaeiris, and it would seem that we have in I. Straussii a dwarf Persian iris of varying colour which corresponds to the South European chamaeiris and olbiensis with their various colour forms. This Persian iris is also remarkable in that the base of the haft of the standards often, but not always, even on the same plant, bears a few hairs of the same colour as the beard, a phenomenon which is also frequent among the Oncocyclus Irises, and occurs, moreover, in I. florentina.

Iris susiana.

(" *The Gardeners' Chronicle*"—*January* 13*th*, 1912.)

An illustration (*fig.* 15, " *The Gardeners' Chronicle*," *January* 13*th*, 1912) shows Iris susiana flowering splendidly, and affords an idea of what might be gained if some means could be found of satisfying the requirements of the other oncocyclus irises. Unfortunately, the difficulty in England lies chiefly in the climate, which induces the rhizomes to make fresh growths in autumn, only to do its best to destroy them in winter. It is for this reason that if lasting success in the cultivation of oncocyclus irises is to be obtained there is the greatest chance of obtaining it by growing them in a position such as that in which these specimens of I. susiana are flourishing, that is to say, where they have the shelter and warmth of a greenhouse wall. Moreover, in such a position it is comparatively easy in summer to arrange some sort of roof over the plants, so that they can be kept dry and their rhizomes thoroughly ripened.

This covering in summer is perhaps less essential in the case of I. susiana than in that of any of its kind, for in some dry positions it has been known to flourish and flower for several years in succession. This greater amenability to cultivation is probably due to the fact that I. susiana has been in cultivation in Western Europe since the latter half of the sixteen century, when it was first brought from Constantinople to Vienna. At the present day it is largely grown in market gardens in the south of France, and its cut flowers sold in the bud state, in which they travel well.

It is unfortunate for us that this partial acclimatisation has only been carried out in the case of I. susiana, which is perhaps the least pleasing of all the oncocyclus irises. The flowers are of great size, it is true, but the colouring of black-purple veins and dots on a grey-white ground is somewhat sombre.

The native habitat of I. susiana is unknown, so far as I am aware. It is not improbably confined to a small area, and it may even be that the species no longer exists in the wild state. Many of the other oncocyclus species appear to be extremely local in their distribution, and there is no small danger that ruthless collection by the trade dealers may result in their extermination.

Some Tibetan Irises.

(" *The Gardeners' Chronicle* "—*April 8th*, 1916.)

By the kindness of Mr. Reginald Farrer I recently received from Chinese Tibet specimens of all the irises that he saw and collected during the collecting season. The specimens are accompanied by notes and by photographs of the plants growing in their native habitats, and our information is therefore unusually complete.

The specimen No. F. 496 is Iris ensata, which is probably by far the most abundant of all the Asiatic members of the Iris genus. In some places, as, for instance, in the neighbourhood of Kashgar in Turkestan, it covers whole stretches of otherwise barren country, and anyone who has attempted to dig up a well-established clump of this iris must have noticed the extraordinary length and abundance of the root fibres which enables it to withstand drought to which other plants would succumb. I. ensata is very abundant also on the lower ground in Kashmir, in the neighbourhood of Srinagar, for instance, and it is apparently no less common in eastern China, near Pekin, and in Shantung, and also in Japan. Plants from all these widely-separated localities closely resemble one another, though there is a considerable range of colour in the flowers, from pure white with a few greenish veins through the common pale slaty-blue to dark blue and purple shades.

It is a curious fact that though Tibet is roughly the centre of the area over which the various forms of I. ensata are distributed, yet the Tibetan form is so distinct as almost to deserve a specific name. By the kindness of the late Mr. W. Gumbleton I received some years ago a packet of seeds from Gyantze in

Tibet, and since then I have received from time to time other specimens from the same country, which, however, always reproduce the same form. The foliage is dwarfer and stiffer than that either of the typical Japanese form, which Thunberg first described, or of those that I have obtained from Turkestan or Shantung. The standards are of a pale lavender, and the falls are edged with the same colour, while the central portion is a pale creamy-white or primrose-yellow, faintly and delicately veined with lavender. The blade of the fall is twice as broad proportionately as it is in the case of the type, where the falls are noticeably narrow. Mr. Farrer's notes on his Tibetan specimens say that the plant is " very abundant all over the grassy loess plains and slopes from Si-ning throughout the Da-Tung Alps to eleven thousand feet, in enormous drifts and masses. Deliciously sweet. May to June. Six albinos seen, some seeding almost true." His letter adds: " One of the most remarkable points about F. 496 is its extraordinary stability. True, I have seen some seven albinos, which sounds a good number, until you remember that I have covered very many miles all sheeted with this iris to the number of many millions of plants. While minute inspection may detect here and there a slightly greater amplitude of fall or depth of lavender featherings round its edge, the general effect of each plant is as like that of the next as one egg to another." This is the iris to which Mr. Farrer has referred in his notes as " hyacinthina."

In view of this uniformity it was therefore all the more surprising that Mr. Farrer should have found a single plant (F. 501) with a very distinct colour scheme, growing among the innumerable examples of the usual lavender form. In this unique specimen the lavender is replaced by deep purple, producing a very striking flower and a very desirable form of I. ensata. A photograph of a plant of the common form (*fig.* 80, " *The Gardeners' Chronicle*," *April 8th*, 1918) shows how extremely floriferous this iris can be in suitable conditions. Unfortunately, in common with many other plants, this iris suffers more from late spring frosts in our uncertain English climate than from the much severer winter temperatures that prevail in Tibet. It should therefore be grown in a position that affords some protection from the bitter east winds of March and April, when the young growths push up rapidly and are especially susceptible to injury.

The question of the affinities of the species native to widely-separated regions of the earth is always interesting. Among the beardless irises the seeds and the capsules that contain them seem to give sure indications of affinity, and a comparison of the known species shows that the only relatives of I. ensata are the members of the longipetala group from the Western United States. Mr. Farrer's F. 499 is a specimen of I. tenuifolia (Pallas), a plant which can only be compared with the Mediterranean I. unguicularis. In habit it is very similar; it produces practically no stem, and herbarium specimens show that the capsules even remain, as in I. unguicularis, hidden down at the base of the leaves, often in old clumps actually below the ground level. Mr. Farrer in his letter remarks that search among the leaves revealed the decaying capsules of past seasons. A plant which thus hides its seeds cannot easily disperse them, and consequently it is never very abundant, but occurs "in small colonies or clumps in the loamy loess grass downs about Chebson Abbey." The flowers are freely produced in May of about the size and colour of the Black Sea form of I. unguicularis, which has recently been brought into cultivation under the names of pontica and lazica. The colour is a blue-purple, with the white ground showing through on the centre of the blade. There is a central streak of yellow running along the haft. As in I. unguicularis, the flowers are supported on slender perianth tubes, six inches or more in length. I. tenuifolia is an attractive and floriferous plant in its native home, but my experience of it as a garden plant has been most disappointing. Some plants that I once received from the neighbourhood of Quetta survived for a year or two, but made no satisfactory growth, while the solitary seedling that I have raised has contented itself with producing three leaves in as many years. For this iris Mr. Farrer's provisional name was hypogaea, given presumably with reference to its habit of hiding its seed capsules at or below the ground level.

The record for altitude is held among irises by I. Potanini, (Maximowicz), which has been found growing at a height of no less than eighteen thousand feet in Tibet. F. 500 is a specimen of this species, which corresponds to the European I. pumila, from which, however, it is easily distinguished by the curiously blunt leaves and by the masses of fine fibrous remains of former leaves that surround the base of the new growths. The original description gave the colour of the flowers as yellow, but herbarium specimens show that, as in I. pumila, purple-flowered forms occur, and Mr. Farrer's specimens confirm this. I. Potanini would certainly be a welcome addition to our rock garden, if only living plants or seeds could be introduced.

Closely allied to I. Potanini, and sometimes confused with it, is another small bearded iris, the I. tigridia of Bunge, which is represented by F. 498. It grows in small clumps on " the steep loess bluffs amid scantiest scrub," above the Da-Tung River, and flowers in May. Mr. Farrer describes its flowers as follows :—" Standards soft purple, styles soft blue, falls of intense claret-purple suffused with ultramarine and of velvety look." I. tigridia is usually a little taller than I. Potanini, from which it may be readily distinguished by its leaves, which taper gradually to a fine point. The stem is as tall as the leaves, which in the present specimens are about six inches in length. Both are distinguished from the dwarf pogoniris of Europe by the semi-transparent membranous sheaths that wrap the base of the growths and by the fibres that surround these sheaths. These fibres are upright and straggling in I. tigridia, but usually curl round in tight masses in the case of I. Potanini.

The specimen numbered F. 497 I take to be I. Bungei, Maximowicz, though whether there is any specific difference to separate that species from I. songarica (Schrenk) is perhaps open to doubt. At any rate, both are Eastern representatives of the great Spuria group. The flowers are small, not unlike those of a small Spanish Iris, and Mr. Farrer notes that they are " intensely fragrant of violets." He found plants " occasionally in good clumps on the hot loess downs above the Halls of Heaven, especially on the torrid banks ascending from the Da-Tung River ; May 20th ; nine thousand feet." It is a dwarf plant, with a stem only a few inches in length, closely surrounded with narrow rigid leaves.

F. 124 is a small slender form of I. goniocarpa " abundant in the lightest scrub and Alpine turf of the Da-Tung chain at ten-twelve thousand feet, May." It is much to be hoped that this delightful little iris, with its mottled flowers of blue-purple and white, may before long be introduced into cultivation. According to Mr. Farrer's experience of the plant in its native home this should not be difficult. " For, while the dry-ground irises here seem characteristically resentful of disturbance, you can do just what you like with I. goniocarpa ; a beautiful albino, taken upon a hot day *en route* and carried round the country for a fortnight, is now not only perfectly happy in the little garden I have rigged up in the yard, but is even bearing a fat pod, apparently containing sound seed." Let us hope that the plant may prove as amenable to cultivation in our gardens as Mr. Farrer found it in China.

A New Iris.

TENUISSIMA.

(*"The Gardeners' Chronicle"—January 13th,* 1912.)

The description of new species from dried herbarium material alone is never entirely satisfactory, but as the publication of what is known of the plants and of the localities in which they are to be found may lead to their introduction into cultivation, it seems at least worth while to give this information with regard to plants only known at present as herbarium specimens. IRIS TENUISSIMA SP. NOV.

This new species was found by H. E. Brown (No. 239) in 1897 near Pit River Ferry in the Shasta County of California at an elevation of 700-900 feet. The only specimens of it that I have seen are five flowering stems and a tuft of leaves on a single sheet, which I found recently among some herbarium specimens of American irises lent to me by the kindness of Dr. Rose from the United States National Herbarium at Washington, D.C. It is distinguished at once from all other American irises by the extreme fineness of the segments of the flower and by the peculiar character of the spathes.

The leaves are linear, acuminate, about twelve inches or fourteen inches long by a quarter of an inch wide, and the rhizome is evidently of the slender wide-creeping kind that is so characteristic of the Western American species. The stems are about a foot in height, clothed with three or four reduced leaves, and each bears a single head of two flowers, enclosed in somewhat broad, acuminate, rigid spathes, about two inches long. The comparatively broad ovary is borne on a pedicel about three-eighths of an inch long, and passes abruptly into a perianth tube of over an inch in length.

Both the standards and the falls are narrow and tapering, about one and a half inches long and another curious feature is that the narrow crests are almost as long as the styles themselves.

In some ways this iris is an approach to I. Purdyi, which, however, has a much shorter stem, both absolutely and relatively to the leaves, much broader and more inflated, bract-like stem leaves and much broader and more substantial segments. The only other species with which it might be compared are I. Douglasiana and I. macrosiphon ; from the former, however, it clearly differs in the formation of the tube and ovary as well as by its very elongated and narrow style crests and segments, and from the latter by the broader, shorter spathes and comparatively short perianth tube.

Unless the specimens described represent some abnormality, the flowers of this iris must be strikingly different from those of any other species, and it would be interesting if seeds could be obtained and the plant introduced into cultivation. The flowers are apparently yellow in colour, though dried specimens are a very unreliable guide in this respect.

Iris tectorum.

(" *The Garden* "—*August* 30*th*, 1919.)

This iris is so distinct and so easy to grow that it is to be regretted it is comparatively little grown in our gardens. Even when a few plants are seen they are seldom flourishing vigorously, and yet this is probably due almost entirely to neglect of one simple rule, namely, to replant it in fresh soil at the end of July or early in August. My experience is that the plants do not drive their roots deep into the soil, but keep them near the surface, and consequently soon exhaust the supplies of food in the soil within reach of their roots. The soil should, I think, be rich in humus and light, except, perhaps, in exceptionally well-drained and warm positions, where heavy soil would probably not be detrimental to the plants. Indeed, it is probable that it is only with the help of clay soil that the plants are fixed on the roofs of houses in Japan, a fact to which, of course, the species owes its name.

I. tectorum belongs to the Evansia section, a comparatively small group of irises, which on the blade of the falls possess a well-marked linear crest like a single cockscomb, in place of the beard of close-set hairs that we find on the Pogoniris. The standards incline outwards, so that the flowers are distinctly flatter than those of bearded irises. The typical plant has flowers of a blue-purple, and the falls especially are marked with diffuse veins of a darker purple, so as to appear almost mottled. This mottling of the falls becomes even more marked in the allied Himalayan group of species, which comprises kumaonensis, Hookeriana and goniocarpa. All of these have now been raised from seeds here and have flowered and shown their affinity to the Evansia group.

I. tectorum has a branching stem about twelve inches or eighteen inches high, and broad, tapering, bright green leaves of a peculiarly thin and hard texture and distinctly ribbed. The ribs occur alternately on each surface of the leaf and it is therefore quite easy to distinguish the foliage from that of a bearded iris by the touch alone.

In the blue type the crest is white, flecked with brown-violet, but in the beautiful albino form these marks are of a pale golden-yellow colour, which also occurs in a few veins at the base of the segments. Otherwise the flowers are wholly of a pure white, and this albino form of tectorum is, to my mind, one of the finest of all white irises. The history of this form is not known, but I remember that I first obtained a few plants from Max Leichtlin of Baden-Baden, whose garden seemed a never-failing source of good things. These plants, when they flowered, proved readily fertile to one another's pollen, and the resultant seedlings all came true to the white colour. Since then I have crossed the white and blue forms, but the plants that result from this cross are of a rather pale washy-purple, distinctly less pleasing than the colour of the blue type.

I. tectorum sets seeds very readily, and the seeds germinate no less readily. There is, indeed, one drawback to this readiness to germinate, for, if the seeds are sown as soon as they are ripe, there is considerable danger that they will germinate in October. This is dangerous, because, if the young plants are in the open, winter frosts will probably lift them entirely out of the ground and eventually destroy them. It is better, therefore, to defer sowing the seeds until October or even November, and they will then germinate readily in the following spring. The plants should be pricked out where they are to flower as soon as they possess four or five leaves of a few inches in length, and they should then grow into flowering plants by the following year. This iris has been cultivated for centuries, apparently, in China and Japan, but, though it is certainly a native of the former country, I know of no record of its having been found wild in the latter. It is common near Ichang, the point on the central reaches of the Yangtse where the cargoes of the junks that have come down through the gorges can be transhipped into ocean-going steamers. It is also fairly common in south-western China, in Yunnan and Szechuan, and it is also apparently not unknown in the hills of northern Burma.

A curious point about I. tectorum is that it will hybridise with a Pogoniris, and that the influence of its pollen is then strong enough to produce in the hybrid the characteristic flat shape of tectorum. At the same time, it has always hitherto refused to combine with the Himalayan I. Milesii. This is obviously a very close relative, and though it is a much larger plant with a much taller, many-flowered inflorescence, yet the individual flowers are disappointingly small.

Recently there have been rumours that Mr. Farrer, who is now exploring the hills on the Burma-Chinese frontier, has discovered an iris which combines the tall growth of I. Milesii with the large flowers of I. tectorum. When I remember, however, that some plants of I. tectorum, which had been grown under glass and drawn up to an unusual height, were once described and very nearly published as representing a new species intermediate between the two, the thought occurs that Mr. Farrer's plants may be merely I. tectorum luxuriating in a moist and genial climate, and that their rhizomes may in this climate produce merely typical plants of I. tectorum. At the same time, a new species that really did combine the best points of I. Milesii and I. tectorum would be a valuable addition to our garden.

Iris tingitana.

(" *The Garden* "—*July 26th*, 1919.)

This North Africa species is admittedly the finest of the Xiphion section, and also the most difficult to flower. So shy of flowering indeed it is, in all but the warmest and most sheltered districts of this country, that its cultivation has been given up as hopeless by all but a few enthusiasts. The latter always hope to obtain, and sometimes succeed in obtaining, a flower or two by growing their bulbs in rich soil and in some sunny corner. More often than not, however, even if buds develop, they are damaged or killed outright by late frosts, for they make their appearance in April. The plants themselves are hardy enough, and multiply rapidly by means of offsets, but a plant that merely produces the long, straggling leaves of I. tingitana without ever flowering cannot expect to retain indefinitely its position in one of the most sheltered spots of the garden.

Accordingly, in August last my patience with this plant was exhausted, and I dug up the bulbs, intending to throw them away in order to make room for something that would give some return for the trouble expended on it. When, however, I had lifted the bulbs, they looked so large and fat and sound that I was loath to throw them away, and it suddenly occurred to me that if I could ripen the bulbs as they must be ripened by the heat of the soil in their native Tangier, they might reward me by producing flowers. I therefore put about half a dozen bulbs into a paper bag and filled it with the sand that represents soil in my garden, and put the bag on top of the asbestos covering of the hot-water cistern in a warm cupboard near the kitchen range. The rest of the bulbs I put in the bulb shed, intending to plant them as late as possible, and only when the signs of recommencing growth should make it inexpedient to leave them any longer unplanted.

The autumn is always a busy time when there are tulips innumerable and iris bulbs to be replanted and only a limited number of daylight hours in which to plant them, and it was not until past the middle of November that I came upon the bulbs of I. tingitana lying in the bulb shed and showing by their green shoots and pushing roots that it was high time they were in the ground. Then I remembered the bag of bulbs on the hot-water cistern and expected to find them dried up or probably dead. When I turned them out they were certainly not so plump and firm as in August, but they seemed sound, and there were no signs of growth in the form of either shoots or roots. I then planted the two lots of bulbs side by side, and it was not long before the shoots of those from the shed were over the ground. Every gardener knows how early in the autumn the new shoots of Spanish Irises appear above the surface, and how the foliage suffers sometimes in hard winters. Obviously it would be better to postpone replanting as long as possible but my experience is that in September, or, if not then, at any rate in October, the signs of growth are so obvious that replanting cannot be any longer delayed.

By the new year the leaves of the group from the bulb shed were several inches in length, but there was no sign of the others. A month later there was still no sign, and I thought that the baking and cooking had been too effective. It was not until well on in February that the first shoot appeared, but soon the growth became rapid, and it was noticeable how much healthier and how much deeper in colour was the foliage of those baked bulbs than was that of those that had merely lain in the bulb shed. From the latter there was not a flower, but among the others the large bulbs all produced their flowers in June.

This year I shall lift all my bulbs and bake them in the same way until about the end of October, and I am inclined to think that I shall treat in the same way as many of the rest of my Xiphiums as I can provide room for. I often notice that their foliage suffers in the winter and that this weakens the bulbs, for I grow mostly hybrids of the early-flowering form of Xiphiums, which for long usurped the name of filifolia. They flower under ordinary treatment a fortnight or more before the older forms of Spanish Iris, and their precocious growth makes them liable to injury from cold.

The flowers from I. tingitana are larger than those of any of the members of this group, and are remarkable for the size and brilliance of the bright patch of orange on the falls. The exact shade of the blue-purple in the rest of the flower varies slightly in the individual plant, but no other colour than this appears to be known. The appearance of an albino form among seedlings would be no surprise, and it would doubtless be a very desirable plant.

It is curious that I. xiphium, which has given its name to the group to which I. tingitana belongs, should stand quite apart from all the others in one respect, namely, in the absence of any linear perianth tube between the top of the ovary and the base of the segments of the flowers. In I. tingitana the tube is often over an inch in length, and it occurs in all the other known species, *viz.* :—filifolia, juncea and Boissieri. Moreover, in hybrids between xiphium and these species, a tube of some length is always present, and its absence in most of the so-called Dutch Irises shows that they are merely forms of xiphium. There are, however, two or three varieties which show the tube, and these are undoubtedly hybrids of I. tingitana and xiphium. Years ago Sir Michael Foster gave me a hybrid between these two species and told me that it consoled him to some extent for his inability to make I. tingitana flower freely. The flower is not as fine as that of the true species, though it is a good substitute. However, a substitute is no longer necessary, for I feel sure that those who will give themselves the slight trouble of following the method I have described will be rewarded with flowers of the best of all the xiphium irises.

I. tingitana ; I. lacustris ; I. dichotoma.

(" *The Garden* "—*September 7th*, 1907.)

The note on Iris tingitana in " *The Garden* " of the 24th ult., is interesting, for it entirely bears out the advice given me last year with regard to this iris by the late Sir Michael Foster. He recommended the annual lifting of the bulbs and the addition of a plentiful supply of old cow manure to the soil.

With regard to Iris lacustris, which was noticed in the number for August 17th, you may be interested to hear that a plant of it is just now coming into bloom in my garden. It did not flower along with I. cristata in the early summer, so that we cannot be sure that it will flower twice in the year. It is growing in a soil composed largely of leaf-mould, the surface being covered with small stones to check evaporation, a plan which appears also to suit cristata in our dry sandy soil.

There is also in flower the uncommon I. dichotoma. The flower spikes stand quite four feet high and are much branched, each head bearing five or six flowers, the general appearance of the plant being more like that of a Pardanthus than of any other iris. Unfortunately, the flowers are small and do not last more than one day. They are somewhat funnel-shaped, of a whitish colour tinged with green and much lined and speckled with lilac-mauve, the tips of the falls alone being free from spots. It is distinctly more curious than beautiful.

Iris stylosa.

(IRIS UNGUICULARIS.)

(" *The Garden* "—*March* 12*th*, 1910.)

I am glad to say that my experience of the behaviour of Iris stylosa during the present season is not that of your correspondent in " *The Garden* " of March 5th, who laments the absence of flowers on his forty clumps. After last summer's dull and rainy weather I quite expected that this iris would fail, but, to my surprise, I found about the beginning of the year that the flower shoots were unusually numerous. The first bud opened on February 7th, and since then we have had a continuous supply. My plants have no protection beyond that afforded by a south-westerly aspect and the wall at their back. The soil is the lightest and poorest of sand, and I believe that it is to this that their success is due. Curiously enough, a group of a very small-leaved variety of Iris unguicularis from the Greek island of Cephalonia, which has hitherto given me only two flowers, is this year full of buds, although it is entirely in the open without any wall to protect it.

Judging by the fragments of soil adhering to various varieties of this iris which have from time to time been sent to me from abroad, they seem to prefer a stiff clay, but it is probably true that it is only seldom that we have sufficient hot sun in England to ripen the rhizomes of plants growing in heavy soil. Where it is impossible to provide them with a light, sandy soil and a dry position, it might be worth while to try the experiment of lifting a few clumps at the beginning of September, keeping them for a day or two out of the ground in an airy spot, shaded slightly from hot sun, and then replanting them in their former positions. New roots form quickly at that time and the plants readily become established again before winter.

I. unguicularis.

(" *The Gardeners' Chronicle*"—*April 22nd*, 1911.)

The worst feature of this iris is its name, and it is indeed unfortunate that Desfontaine's name I. stylosa is thirteen years junior to Poiret's uncouth appellation, and cannot, therefore, properly be used. Moreover, the name stylosa is eminently suited to the plant, for it is one of the very few irises in which the style rises undivided for some distance above the top of the perianth tube before branching into three.

However, I. unguicularis has many redeeming features, except, perhaps, in the eyes of those who garden in a cold, wet clay, and have not a warm, sunny corner against the house, where the addition of plenty of old mortar rubble to the clay would probably make this iris quite happy. When it does well it rewards us liberally for care in planting, for it is a joy to watch its buds unfold and open indoors in the warmth on a cold winter's day, and a large, well-established clump is quite capable of producing a hundred flowers at intervals between November and April.

One of the most curious features of this iris is that, as a rule, scarcely any stem develops, and the flowers are only thrown up on a long perianth tube, six or more inches in length. The consequence of this formation is that the ovary is well protected from all but the severest frosts in its shelter at the base of the leaves ; indeed, in old-established clumps numbers of decaying capsules of seed may often be found deep down among the growths.

The species was first described as an Algerian plant, and many years later a Greek form was named I. cretensis by Janka. In his description he was so intent on pointing out the distinctions between I. cretensis and I. humilis, M. Bieberstein, which, indeed, are many and fairly obvious, that he quite forgot to tell us how to distinguish it from I. unguicularis. It has been said that the spathes are more scarious, and that the segments taper more gradually, but neither of these characters seems to be reliable. The only difference is in size, and whether this is inherited or due to environment has not yet been proved. So far, I have not been able to get seed of the Greek forms, though, with less arctic weather than that which April has so far brought us, I am not without hope of doing so this year, for there is abundant promise of flowers still to come.

The form that usually goes by the name of I. cretensis has narrow leaves that grow in upright tufts, after the manner of the ordinary I. unguicularis. I have, however, a form from the island of Cephalonia, which produces flat, fan-like spreading growths, and this throws its flowers well above the leaves. Its colour is a dark-reddish lilac and its flowers are never produced before April. Another form, which I believe comes from Asia Minor, and which I obtained under the name of I. agrostifolia (the name has apparently no authority), has extremely narrow, upright leaves, narrower, I think, than those of any other iris. It is not very floriferous, but does not differ widely in flower from the Cephalonian form.

Sixteen years ago, Albow., in his "*Prodromus Florae Colchicae,*" *p.* 232, described as a new species I. lazica, which is said to differ from I. unguicularis by the much shorter tube and distichous leaves. Its name is derived from the locality in which it grows, namely, Lazistan, the region along the south shore of the Black Sea beyond Trebizond, at the extreme eastern limit of the Turkish dominions. This plant has recently been introduced into cultivation by Mr. C. G. Van Tubergen, junr., of Haarlem, who has very kindly sent me flowers. It was shown, I believe, for the first time at the Haarlem Jubilee Exhibition last spring. A plant growing here has very broad leaves and the fan-like habit of the Cephalonian plants. No flowers have yet appeared, though I think that buds are pushing up. The flowers that I have received are of a dark-reddish lilac on the blade of the falls, the hafts of which are veined with the same colour on a white ground. The central yellow line is present, as in all the forms of I. unguicularis, the style rises likewise in a column for some distance, and, moreover, the one feature which is peculiar to I. unguicularis is also present in this form, namely, the beautiful appearance as of gold dust on the back of the style-branches. This phenomenon is produced by a number of transparent, whitish, conical projections, each of which is topped by a similar sphere. The golden colour is produced by a mass of brilliantly coloured grains, which varies in position from the centre of the sphere to any part of the supporting cone. Both cones and spheres are very fragile and appear to be filled with a colourless liquid. They present a beautiful sight under the microscope, and occur, as far as I know, in no other species of iris. I. lazica also agrees with all the other forms of I. unguicularis in that the apex of the filament is adherent to, but not coherent with, the style column.

The really distinct feature in I. lazica is the presence of a stem of about three inches in length, which is triangular in section and equal in length to the perianth tube, which is thus much shorter than the usual length in I. unguicularis. Curiously enough, the " *Botanical Magazine* " figure of I. unguicularis, *tab.* 5773, represents a stem about as long as the tube. No mention is made in the text of this feature, and it may be that it does not occur in plants from Algiers. Seedlings of the ordinary garden form, which are now flowering here, vary considerably in the length of the tube, in the shade of colour in the flower, in the shape of the segments (which in some cases taper gradually and in others have a definite constriction between the blade and the haft of the falls), and also in the extent of the indentations in the style crests, which has sometimes been put forward as a difference between I. cretensis and I. unguicularis. On the whole, then, it would seem best to refuse specific rank to I. lazica, and reduce it to a local variety of I. unguicularis. It is curious to notice that the broad-leaved forms occur at the western and eastern extremities of the area over which the plant is distributed. Is it due to the dry, poor soil of Greece that its forms are starved and stunted ?

Treatment of Iris unguicularis.

(" *The Garden* "—*February* 1*st*, 1913.)

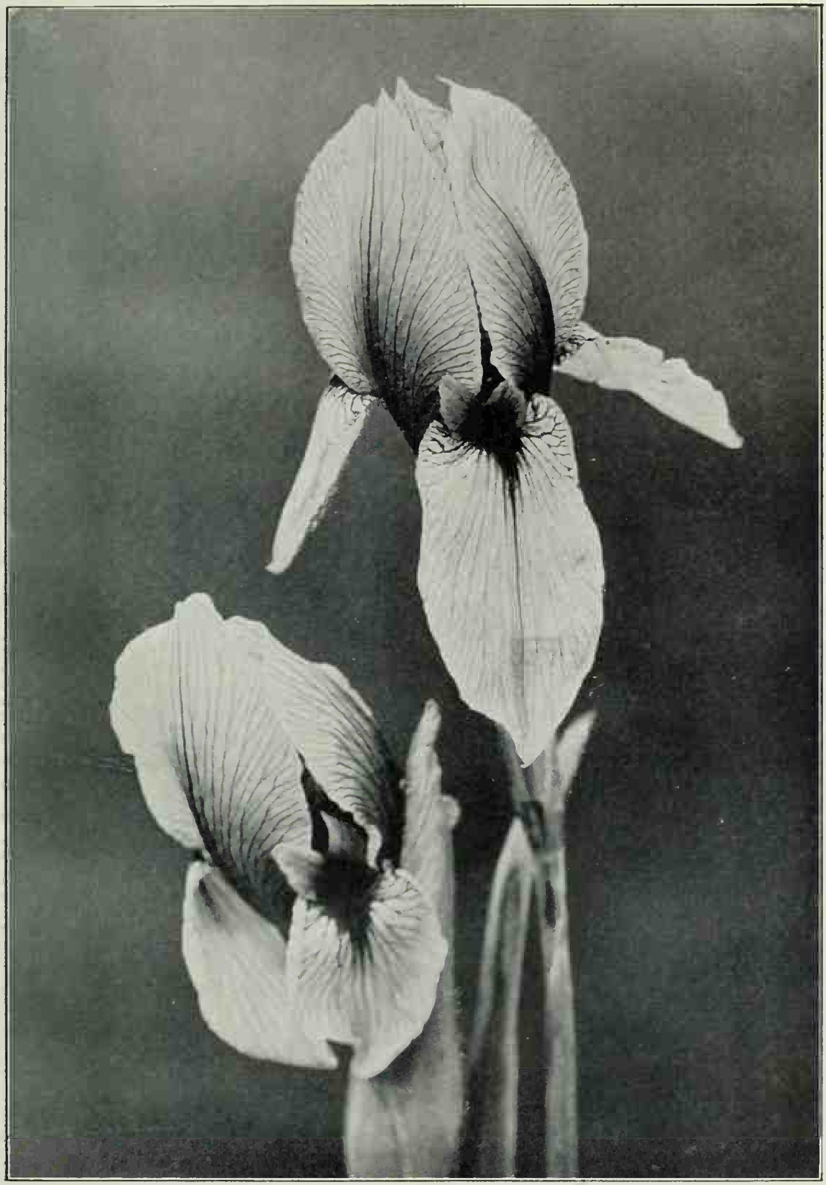
A note on Iris unguicularis (stylosa) in " *The Garden* ", *p.* 2, *issue January* 4*th*, suggested that transplantation in spring might induce clumps of this iris which had remained flowerless to produce a crop of blooms. In the first place, it is at least doubtful whether it is wise to transplant this iris in spring. Growth obviously begins when the soil becomes thoroughly wet in autumn and continues, except for interruptions by hard frost, until mid-summer. As a general rule, it may be said that irises should be transplanted while growth is active, and, if possible, when growth first becomes active. In the case of I. unguicularis, this usually begins early in September, and I am inclined to think that this is the best period at which to transplant this iris. Provided that the plants are placed close to the foot of a warm, sunny wall in somewhat poor, light, well-drained soil, the number of flowers produced seems to depend on the weather, although it has been a surprise to find that plants are blooming fairly well this winter in spite of the lack of sun in the latter part of the summer. Last winter, when the flower buds had formed in vast numbers during the long summer drought, the majority of them were killed by hard frosts before they had time to develop and when their presence could only be detected by dissecting the base of the growths. If the plants can be given a sunny position in suitable soil close to the foot of the greenhouse wall, where they reap the benefit of warm pipes on the other side of the wall, they seldom or never fail to produce their crop of flowers.

Iris unguicularis.

(" *The Gardeners' Chronicle* "—*February* 1*st*, 1919.)

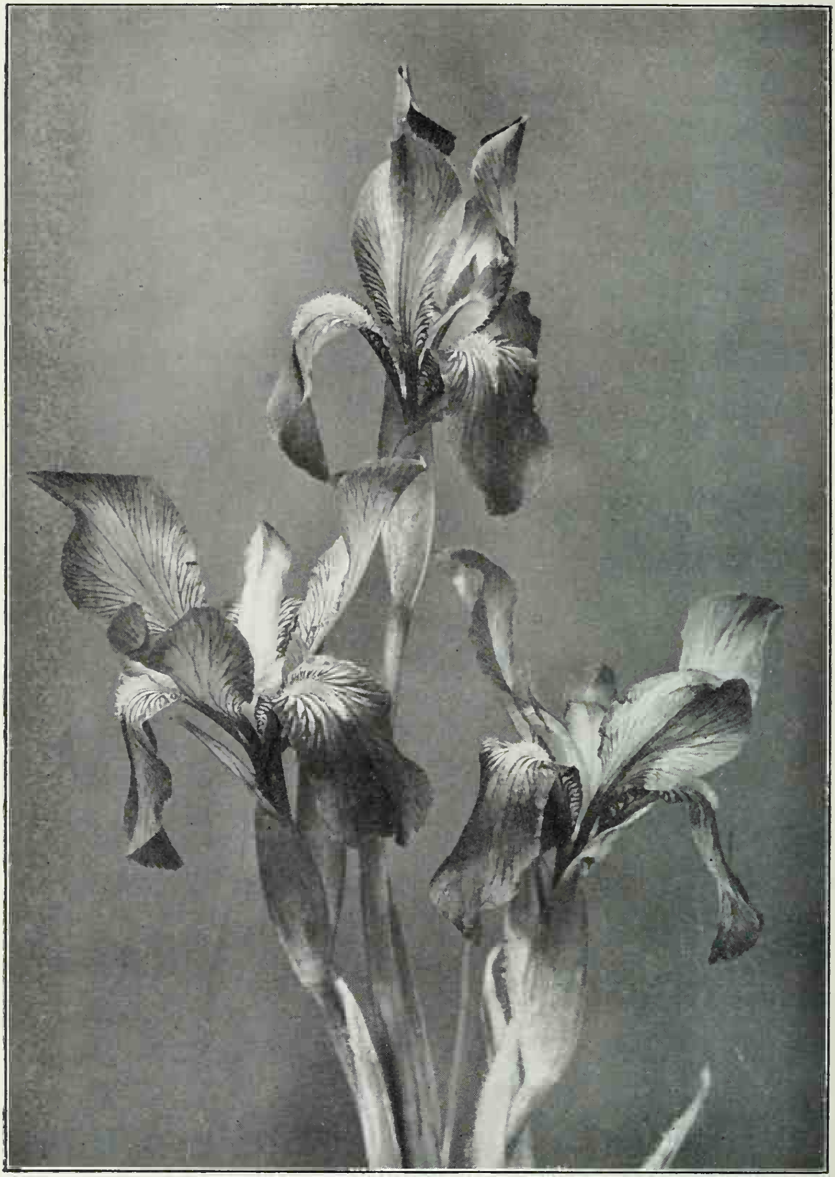
Iris unguicularis is one of the most delightful and valuable of hardy winter-flowering plants, but it is comparatively seldom that the best use is made of it. Those alone can fully appreciate this iris who have gone out in the dreariest of wintry weather to pick a handful of the buds, and who have then watched them unfold rapidly in a warm room and fill it with their fragrance. Only too often this iris is found growing in almost sunless or exposed positions, where few buds develop, or else the plants have been allowed to develop into such a tangled mass of growths that they do little more than provide shelter for slugs and snails, which make short work of the buds before the time has come to pick them.

It is surprising for what a number of years a plant of this iris will continue to flourish undisturbed in even the poorest of soil. The root-fibres penetrate to a great depth, and seem



IRIS KOROLKOWI

See page 5 and index



IRIS STOLONIFERA

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to enjoy the hungriest of sand. But, in spite of the fact that some flowers are produced even from the most matted tangle of growth, yet my experience has been that after a few years it is really better to lift and break up some of the clumps, even though there will be a partial loss of flowers for the first ensuing season. The plants may be moved with success early in September, though I am inclined to think that the operation is equally, if, indeed, not more, successful when carried out in April. At any rate, a year ago last April I decided that the time had come when two huge clumps must be divided if they were not to dwindle away, for they had remained undisturbed for ten years at least. The sandy soil underneath them had solidified to such an extent that it was almost as hard as the sandstone which forms the core of this hill. Not wishing, however, to make the soil too rich, for this would produce an abundant growth of foliage and an almost entire absence of flowers, I contented myself with merely digging up the soil about three spits deep and incorporating in it a certain amount of the old leaf-soil and a liberal dressing of basic slag. I then broke up the clumps into small pieces, and re-planted them at once, for there were signs of new root-growth. This I encouraged during the ensuing summer by soakings of water in any period of drought and by occasional light dressings of nitrate of potash. Last winter, as I had anticipated, there were comparatively few flowers, but this year I am being rewarded by a most abundant crop of blooms. Five or six times the space occupied by the two clumps which I broke up is now covered with vigorous growths, which are flowering profusely. Fortunately, we have so far escaped from any exceptionally sharp frost, such as sometimes kills the buds in wholesale fashion—a possibility which suggests that it is quite worth while to put an old light over the plants when severe cold may be expected.

It is unfortunate that the uncouth name of unguicularis is older, and therefore botanically more correct, than that of stylosa, which is not only more euphonious, but also peculiarly appropriate, for it refers to the curious way in which the three narrow style-branches rise together in a slender column for nearly an inch before spreading outwards. This is a feature which, if I remember rightly, does not occur elsewhere among irises, and the species is also unique in that the anthers and the filaments adhere firmly to this column and to the style-branches, though they are not actually joined to them.

There are several local forms of this iris, the best being probably the common Algerian variety, with lavender flowers.

There is at least one, and probably more than one, white form, but the colour is an ivory-white, and the shape is less pleasing than that of the type. The Greek forms have more scanty foliage, flower only in spring, are of a deeper purple colour, and have a stronger, sweeter scent, more like that of fresh honey. Dwarf forms of this variety are found on some of the Greek islands, *e.g.*, Cephalonia, while in southern Asia Minor there are forms with very narrow, grassy foliage and slender, narrow-petalled flowers of no great beauty. Curiously enough, the form from the eastern end of the Black Sea, which has been introduced under the name of I. lazica, has broader foliage, of less leathery texture than that of the Algerian plants. The flowers are of a deeper blue-purple, but for some reason the plant declines to flourish here.

Iris unguicularis.

[CUTTING-BACK FOLIAGE.]

("*The Garden*"—*June 5th*, 1920.)

I am sorry to have to disagree with Mr. Jenkins, but I think it is only right to point out that Iris unguicularis can be made to flower by cutting the long leaves back to half their length about this time of year. I must admit that I should have thought that such treatment would have been fatal to the well-being of the plant, but within the last few days I have seen large clumps which are annually treated in this way and which do bear flowers abundantly.

What the explanation is I cannot say, but it may be that in soils where the plant grows luxuriantly, the foliage becomes so thick as to prevent the sun's rays from reaching the rhizomes and ripening them so that they will bear flowers. The cutting back of the foliage would in that case let in the sunlight and the air, and it may be due to this fact that the plants of which the leaves are cut back do undoubtedly flower freely.

Iris Urumovi.

("*The Gardeners' Chronicle*"—*October 24th*, 1914.)

In September, 1910, I visited the gardens of MM. Vilmorin, at Verrières-le-Buisson, and noticed in a pot the remains of a small iris which I did not recognise. Fortunately the plant had set seeds and my request to be allowed to take a capsule of seeds was readily granted. From these seeds I succeeded in raising a number of plants, which began to flower in May, 1912. They were evidently related to I. graminea and to I. Sintenisii, but differed obviously from either. Their uniformity pointed to the fact that they represent four species, and I tried to make the description of I. Urumovi fit them. This species was first described by Velenovsky, of Prague, in the "*Oesterreichische Botanische Zeitschrift,*" *for* 1902, *p.* 115. The description fitted the plants admirably except in one point, namely, the statement that I. Urumovi differs from I. Sintenisii by its non-glaucous foliage. This seemed, however, a fatal objection to the identification of my plants with Velenovsky's species, and I determined to await developments.

In April of this year I was able to examine the collection of European irises which the Hon. N. C. Rothschild has recently got together, and found in it one sole survivor of some plants of I. Urumovi, which had been sent to him from the *locus classicus* of the species. I recognised it at once as being identical with my plants, and I began again to compare them with the original description. The only explanation of the latter that I am able to offer is that either the plants were described from dried material or else the description was drawn up from notes which conveyed exactly the opposite sense to that which they were intended to convey. The latter seems the more probable explanation, for it is certainly curious to find that an iris is said to differ from I. graminea by its greenness. The green, polished leaves of I. graminea are one of its most noticeable features, while I. Urumovi is noticeably glaucous, especially in the lower part of the leaves. Moreover, Velenovsky appears to contradict himself by calling attention to the fact that the spathe-valves, and often the leaves also, are rough. This is true, but a plant that is so glaucous as to be actually rough to the touch can hardly be greener than I. graminea. As a matter of fact, it is this extremely glaucous character, the non-keeled spathes, the slender habit, and the fact that the leaves die right away in winter, that distinguish I. Urumovi from I. Sintenisii. From I. graminea the dried plant can be at once distinguished by the long, slender neck of the ovary. From I. Sintenisii it will be much more difficult to separate it in the dried state, unless it is possible to see whether the spathe valves have the sharp keel along their whole length which is characteristic of I. Sintenisii.

The stems are numerous, six to ten inches in length, slightly overtopped at flowering time by the narrow, ribbed foliage, which eventually increases to about eighteen inches in length by a quarter of an inch in width. The spathes vary in length from two and a half to four and a half inches, even on the same plant. They are rounded at the top and so glaucous as to be rough to the touch. They are keeled only at the apex and entirely herbaceous. Each spathe contains one or more, usually two, flowers, set on pedicels an inch or more long. The short ovary has double ribs at the three corners and tapers to an inch-long slender neck, which expands into the short, broad tube.

The flowers closely resemble those of a small I. graminea. The haft of the falls, however, is narrow and almost linear, and passes with a very slight constriction into a small ovate blade. The haft is veined with pale purple on a greenish-white ground, and the blade with deep blue-purple on white. In the centre there are numbers of minute dots such as are usually found also in I. Sintenisii. The standards are short and narrow, of a uniform dark red-purple. The stigma is two-toothed, as are those of all members of the spuria group, and the pollen is orange—another characteristic of the group.

Although I. Urumovi is by no means a showy plant, I have been surprised at the attention which this small, slender iris has attracted among visitors to my garden this year. It is certainly floriferous, and the quiet colouring of the flowers harmonises with the glaucous grey of the foliage.

Iris Vartani.

(“ *The Garden* ”—*February 8th*, 1913.)

This winter-flowering iris of the reticulata section is not nearly as widely known or grown as it deserves to be. Its flowering season is from October to January, and as an iris for growing in pans to brighten the alpine house in the dull winter days it has few equals. When grown outside, it should be given a favoured position under a wall or a sheltered niche in the rock garden, and it is one of those plants showing a decided preference for a light soil. The chief colour of the flowers is a slaty-blue, the broad falls being almost white, copiously veined with a lavender hue and having a very pretty yellow crest. The erect standards are slaty-blue. It is a native of Palestine, and is named after Dr. Vartan, of Nazareth.

I. Vartani alba.

(" *The Gardeners' Chronicle*"—*December 23rd*, 1911.)

A delightful addition to our winter-flowering irises is now available in the white variety of I. Vartani, which was already in bloom on December 5th, both in the open ground and also in a pot, where the bulbs had no more protection than was afforded them by the shelter of a cold frame.

This plant has appeared, I believe, in various catalogues as a white form of I. histrio, but it is much more probable that it has been obtained from the Palestine representative of the reticulata group, to which the name of I. Vartani was given. Whether we look upon I. Vartani as a species or as a form depends, of course, on the view we take of the meaning of a species, but in any case the white form agrees with the type in having noticeably long and large crests to the style-branches and in the almond perfume of the flowers. Moreover, I understand that this albino appeared among cultivated plants in the neighbourhood of Jerusalem. It is unfortunate that the cultivator has presumably over-cultivated and over-fed his bulbs, with the result that a certain proportion of the flowers show deformities or abnormalities in the shape of an extra fall or style-branch, in addition to the usual number. In a letter which I received from the raiser, he even insisted on the fact that the bulbs were capable of producing flowers with four or six falls. As a matter of fact, the bulbs were very large and each is producing two or three flowers, but I still fail to see that the extra fall in any way adds to their beauty. Indeed, the normal form is, to my mind, infinitely preferable.

The slender standards are not erect, but diverge outwards at an angle of about forty-five degrees; the style-branches with their crests are as long as the falls, which have a narrow, lanceolate blade. The whole flower is pure white, except for the raised, pale greenish-yellow, central ridge running along the haft of the falls and for a few faint veins of the same colour on the blade and haft.

The leaves are about the same height as the flowers, and are distinguished by a very long, white, horny tip. The tip, which in some cases is over a quarter of an inch long, is comparatively much longer in this iris than in other reticulata irises at present known to us.

Unless it proves to have a better constitution than I. Vartani, it will probably fail to ripen bulbs in the open. Plants in pots need careful treatment when the flowers are over if their growth is to be well ripened, but if the soil has been made sufficiently rich, and if the roots are watered judiciously until the leaves begin to turn yellow, it should be possible to obtain some bulbs for another year.

I. Wattii, Baker.

(" *The Gardeners' Chronicle* "—*February 20th,* 1915.)

Towards the end of 1911, I received from the neighbourhood of Yunnan-fu, in south-western China, a small packet of iris seeds that I did not recognise. I was indebted for them to the kindness of Père Ducloux, and I was the more glad to have them because I felt sure that if they were seeds of an iris at all they were seeds of a species that was either new or, at any rate, not in cultivation. The seeds were small, either pyriform or almost globular, with dark brown, slightly wrinkled skins, and a small, creamy aril that suggested affinity to such members of the Evansia section as I. Milesii or I. tectorum. The possibility did suggest itself that the seeds might be those of I. japonica, which has never yet, to my knowledge, been known to produce sound seeds. The new arrivals were sown at once in pots plunged to the rims in the open and germinated readily in the spring. The young plants with their thin, broad leaves also resembled seedlings of the Evansias, and it was with considerable curiosity that I watched the development of the plants.

It soon became obvious that whatever they were they differed widely from any other known iris, although least perhaps from I. japonica. All through the summer the plants continued to grow until, in August, the stems were nearly two feet high. No other iris produces a stem without also producing flowers, and when I went away towards the end of the month I left instructions that I was to be recalled immediately if flowers suddenly appeared. Nothing happened, however, and the leafy stems had to contend against the winter. Most of the leaves on each stem succumbed, but the terminal tuft survived in most cases. However, there were severe late frosts in the spring of 1913, and I was only rewarded by a single flower in May, and that was partly misshapen.

About the same time, when it was evident that the stems had now completed their growth and that they had failed to produce flowers, owing to the climatic conditions, sturdy young shoots began to break through the ground on all sides, and soon made rapid growth. The stems grew to be nearly three feet high in some cases, and the leaves were two and a half or three inches broad and eighteen inches long. The following winter and spring were more favourable, and in May, 1914, nearly every stem produced a raceme of flowers from its terminal tuft of leaves. The flowers closely resemble those of I. japonica, except that they are slightly smaller and of a paler, almost transparent white, tinged and sometimes mottled, with mauve. Here in the open ground the effect of the branching sprays of delicate flowers was rather marred by the disastrous results of the storms of winter on the lower leaves on each stem. It is, however, easy to imagine that in a cold house or in more sheltered gardens than this, and especially perhaps in the favoured localities in the south-west of England, this iris would be most pleasing. Even here the tall stems, with their broad green leaves, at once arrest attention in mid-winter, when all the surrounding irises have died away completely or nearly to the ground level, and consist for the time being only of tufts of withered brown leaves.

For some time I had been aware of the existence among herbarium specimens of a broad-leaved iris, which I was inclined to assign to I. japonica, though I was doubtful as to the correctness of the determination. It was only recently that, on once more going through the Kew herbarium specimens, I came again to the single specimen, No. 6,337, collected by George Watt on the summit of Khongui Hill, Manipur, during the Government Demarcation Survey of 1881-82. I had formerly identified this specimen with I. Milesii, and when the terminal tuft of leaves with the inflorescence is cut from the top of the stem the plants are certainly very similar. Moreover, I knew from Foster's MSS. that he had received seedlings from Manipur which turned out to be merely I. Milesii. When, however, I looked again at I. Wattii with my unnamed iris in my mind, I saw at once that the two were identical, and that the supposed specimens of I. japonica from Yunnan were in reality also to be referred to I. Wattii. By a curious coincidence Dr. A. Henry, who many years ago collected specimens at Mengtz in Yunnan, happened to be at

Kew that day, and I was able to talk over the plants with him. From my account of the behaviour of the plants in my garden and from the specimens I was able to show him he had no hesitation in agreeing with me that the mystery of I. Wattii had at last been solved. I am now convinced that the following plants, which have been hitherto referred to I. japonica, are really specimens of I. Wattii. All are in the Kew Herbarium. Ducloux's No. 26, from Yunnan; Henry's Nos. 11,821, 11,821A and 10,599, from an elevation of five thousand feet near Mengtz; Hancock's No. 464, 1896, from six thousand feet above the Red River in the same locality; Forrest's No. 1,898, from ten-eleven thousand feet on the east flank of the Tali Range; and a specimen received from Siam by Messrs. Sander & Sons, and sent to Kew in December, 1908.

It is now possible to supplement Baker's original description of I. Wattii given on *p.* 17 of his "*Handbook of the Irideae,*" by the following details taken from the living plants that I have had under observation here. The rhizome is very slender, and sends out wide-running, stoloniferous growths. The stem, which may be as much as three feet high, is very distinctly flattened, above half an inch broad, and bears a leaf on alternate sides at each node. The internodes become eventually about three inches long. The leaves may be as much as three inches broad at their middle, and have a polished upper surface. All the six segments of the flower are extended horizontally, and droop slightly at their extremities. The standards are of a plain mauve-white colour, with a blunt, widely emarginate end. The falls have a short, broad, triangular haft and an oblong blade with a finely-serrate edge, which becomes waved at the extremity. Along the centre of the haft and on to the blade runs a raised orange-yellow ridge, which becomes very prominent on the blade, where it is surrounded by a small patch of orange-yellow. It is flanked on each side along the haft by two or three rows of orange blotches. This crest is very thin, and might easily be invisible enough to escape notice in a dried specimen, and Baker's expression, "apparently not crested," is probably to be explained in this way. The colour of the falls is a pale mauve-white, with some mottlings of a deeper mauve. The stigma is entire, the filaments are of a pale mauve-white, the anthers white and the pollen cream. The capsule is about an inch or an inch and a half long, oblong in outline and roughly trigonal in section, but with the sides somewhat inflated and wrinkled.

To the botanist the chief difficulty about I. Wattii is to distinguish it from I. japonica. In the garden the plants are easily separated by their habits of growth. I. japonica produces no stem in the year previous to that in which it flowers, and the foliage is narrower and of thicker substance. In the dried state the chief difference between the two species is to be found, perhaps, in the spathes. In I. japonica these are small, and the two valves are equal in size. In I. Wattii the outer valve is often twice as long as the blunt inner valve, and tapers to a fine point.

The amount of branching in the inflorescence is variable. There may be as many as nine lateral branches, of which the lowest bears, in its turn, four smaller branches, the next two and the third from the bottom only one, while the upper six are simple. On the other hand, the main stem may be quite short and only produce one or two lateral branches.

The plants appear to be quite hardy, even if the fickle weather of our spring is sometimes fatal to the flowers. So far as my experience goes they are certainly easiest to cultivate in light, rich soil which is not allowed to get too dry. By cross-fertilisation among the different plants I was able this year to obtain a few capsules of seed, and it will be interesting to see to what extent later generations of this species adapt themselves to our climate conditions.

Iris Watsoniana.

(" *The Gardeners' Chronicle*"—*June 6th*, 1914.)

This Californian iris, which was first described though somewhat inadequately by Mr. Carl Purdy, in "*Erythrea*," *v.*, *p.* 128, is there said to resemble I. longipetala (Herbert) in its growth, but to have flowers more like those of I. Douglasiana (Herbert). Unless the present plant is something other than Purdy's species, it shows, to my mind, far more resemblance to I. tenax (Douglas) than to either I. longipetala or to I. Douglasiana. In some ways, indeed, its resemblance to a strong-growing form of I. tenax is striking, but it is distinguished by its slightly longer perianth tube, by the more sharply three-sided ovary, and by the fact that strong-growing specimens produce branching stems on which as many as eight or nine flowers develop in succession. In this respect and in its ovary, I. Watsoniana closely resembles I. Douglasiana, from which, however, it is easily distinguished by the shortness of the perianth tube, by its seeds, by its foliage and by its divergent spathes, of which the two valves are usually attached an inch or more apart.

Its leaves are of a light and somewhat yellow green, and grow to a length of about twenty-eight inches by three-quarters of an inch in breadth. The upper part droops so that the stems, which vary between fifteen and twenty inches in length, are not hidden among the leaves, but show well above them. The foliage dies away almost entirely in winter and is not persistent, like that of I. Douglasiana. The stems are either simple or branched, and are entirely clothed with narrow, reduced leaves. They are suffused with bright pinkish-purple at the base.

The spathes are almost identical with those of I. tenax. They are quite herbaceous, narrow, sharply keeled, one being usually set an inch or more below the other. The short pedicel of the first flower springs from the point of attachment of the upper spathe valve. In the later flowers the pedicel is often as much as one and a half inches long. The ovary tapers slightly towards either end, and is neither so rounded as that of I. tenax nor so sharply triangular in section as that of I. Douglasiana. The perianth tube is short, one-quarter to half an inch, but longer than that of typical I. tenax.

The flowers are relatively large, of some shade of violet or lavender-purple, usually with a curious suffusion of blue down the centre of both standards and falls. The latter extend almost horizontally and have on the posterior part of the blade a yellow or creamy-white patch veined with deep purple.

I. Watsoniana grows readily and is most floriferous in a well-worked, warm, sandy soil. Together with other Californian irises, it does not lend itself to transplantation, though this operation may be carefully carried out with some success immediately the flowers are over. Any disturbance in the late autumn is almost certain to be fatal to the plants. The best method of increase is therefore by seeds, which germinate readily and give rise to large-flowering plants in the second year after their germination.

IRIS DOUGLASIANA VAR. ALPHA.

The seedling form of Iris Douglasiana (Herbert) known as Alpha has the sturdy, dark-green foliage of the type. The old leaves persist through the winter and then die away to a curious, almost brick-red colour in spring, when the new leaves are produced together with the flower stems. These are developed freely and reach a height of some twelve inches, standing almost erect in the centre of the plant. The leaves are eighteen to twenty-four inches long and droop outwards, so that the flowers are not obscured.

The colour of the flowers is a creamy-white. On the blade of the falls near the end of the style-branches there are a few deep crimson-purple veins, between which the ground is suffused with faint yellow.

Two or three flowers are produced in succession from each spathe, so that the display lasts for a considerable time.

I can see nothing in the plant that is not typical of I. Douglasiana, which is so variable a species that, in my experience, no two plants produce flowers exactly alike, except, perhaps, in the fact that the spathes and the sheathing leaves on the stems are suffused with pinkish-purple. It is possible that this is the result of some chance fertilisation with pollen of some other Californian species. The seed parent, at any rate was I. Douglasiana.

The remarks on the cultivation of I. Watsoniana apply also to I. Douglasiana.

Iris sibirica and its Allies.

(" *The Garden* "—*July* 18*th*, 1925.)

Most gardeners have heard of Iris sibirica even if they do not grow it, but comparatively few realise that it is only one of a number of species that form together a separate section of the genus. All come from Europe or Asia, with the single exception of the American I. prismatica, which is very distinct, but which seems, at any rate, more closely allied to the members of the sibirica group than to those of any other section of the genus.

All the members of the sibirica section like a cool, moist soil containing plenty of humus, and some will succeed where the roots penetrate below the water level in the soil, though they are also capable of doing well in a herbaceous border provided that the surface is mulched and manured. In my experience, divided plants never do so well as those which are put out as seedlings into their flowering positions and left undisturbed. There is, of course, the difficulty that seedlings of the different varieties do not come absolutely true from seeds, while even among seedlings of the species there is a certain amount of variation. When plants must be moved, or when it is desired to propagate by division a particular form of variety, the operation is best carried out either in early April when growth is just beginning or in September when the soil is usually moist and comparatively warm. If plants are moved in April, great care must be taken to keep the ground round them moist until they are completely re-established.

It is characteristic of the various members of the sibirica group that they form a more or less compact mass of slender rhizomes, from which grow a large number of roots, a great contrast to the somewhat sparse root-fibres of the bearded irises. All the species except the Himalayan I. Clarkei and the American I. prismatica have more or less hollow stems, though in the case of some, such as I. chrysographes, the central cavity is nearly filled with pith.

I. sibirica itself seems to owe its name to a confusion with I. orientalis, because it appears to be a European species, and it is doubtful whether the true plant is found east of the Urals. It grows wild near the upper part of the Rhine in Switzerland, Hungary and Central Russia. The relatively small blue flowers stand high above the foliage on tall, slender stems, which are nearly twice as long as the leaves. I. orientalis has large flowers on shorter stems, which only raise them above the foliage because the tips of the leaves bend over and droop. Of both species there are albino forms, that of I. orientalis being the well-known Snow Queen, which is a purer white than that of the various varieties of I. sibirica, for the latter are more or less tinged or flushed with faint lilac or blue.

Some forms of I. orientalis have their spathe valves heavily flushed with red-purple, which has earned for them the name of sanguinea, though these red spathes are by no means a constant character.

Hybridisation between these two species produces interesting results, for the deep blue of the wild flowers can be diluted to a sky-blue by crossing with the white, and the large flowers of orientalis can be obtained on the tall stems of sibirica.

Both I. sibirica and I. orientalis have their flowers heavily veined and flushed with deep blue-purple on a white ground, which can, however, be changed to yellow by crossing them with I. Wilsoni, a yellow-flowered species from Western China. The latter is not a very striking plant, for the yellow is pale in the somewhat twisted standards, and often dotted and flecked with purple on the falls.

I. Forrestii is another species from Western China of more slender growth and narrow grassy foliage, but with flowers usually of a far clearer yellow and of more pleasing shape.

The most richly coloured species of the whole group is I. chrysographes, which earned its name, when I first saw it in flower, from the fact that its deep velvety-purple falls are veined or streaked with gold over their central area. It comes from western China, where there appear to be several other closely-related species or local forms. It is unfortunate that the various explorers, who since the beginning of the century have visited the great storehouse of good plants in western China, seem all to have been more interested in rhododendrons and other flowering shrubs than in anything so lowly as an iris. Consequently, we do not know as much as we might about this group of irises, and can only suspect that there are several good things yet to come into our gardens.

I. Bulleyana was first described as a wild species from the same region, but the variation among its seedlings casts some doubt on its claim to specific rank. It grows about two feet high, with somewhat narrow leaves and has flowers veined and blotched with blue on a white ground.

One of the tallest of the irises and one that is valuable for its habit of flowering late in June is I. Delavayi, with long, drooping falls, on the central area of which appear large white blotches amid the surrounding purple. The first introduction of this species brought a form with dark red-purple flowers, but, later on, some seeds, which were, I believe, collected by Mr. E. H. Wilson, gave me a whole series of colour forms, ranging through blue-purple, as well as red-purple. A very pretty hybrid can be made by crossing I. Delavayi with I. Forrestii or I. Wilsonii, for then the white ground of the falls becomes yellow.

The Himalayan I. Clarkei, from the neighbourhood of Darjeeling and the Chumbi Valley, is distinguished by the polished upper surface of its foliage and by its solid and not hollow stem. There is also extraordinary variation among the flowers, both in the shade of purple colour and in the markings and blotches on the falls. The stem also branches low down and often more than once, so that this species is abundantly distinct from the others in the group.

I. prismatica, from the north-eastern United States, has flowers like those of a small I. sibirica on wiry stems, which are characteristically bent and not stiffly erect as in the case of I. sibirica itself. The growth is much less compact than that of the European and Asiatic species, and the tufts of leaves appear at some distance from each other. To do well I. prismatica needs a moist, cool position.

All these irises are easily raised from seeds, and should be sown in the autumn in pots, which are best sunk to the rim in a bed of sand or ashes in an open position. The young seedlings should appear early in the year, and the pots may then be given the protection of a cold frame. By the end of May or early in June they should be big enough to be planted out in their permanent positions, where they should begin to flower in the following year.

Certain white-flowered species.

(" *The Gardeners' Chronicle*"—*September* 17*th*, 1910.)

Of the various white-flowered species of bearded irises in cultivation, the two most common are I. florentina and I. albicans, but considerable confusion appears to exist both in gardens and in herbaria as to the identity of the two. This confusion dates back to the time of Linnaeus, who defines florentina as a bearded iris and then bewilders the reader by referring him for illustration to *plate* 154 in Miller's " *Icones*," which clearly represents some member of the spuria group. Thunberg's description in his " *Dissertation* " (1782), scapus simplex, subtriflorus, pedalis et ultra," is too vague to allow of identification, and it is not until the plate appeared in the " *Botanical Magazine*," *tab*. 671, that a plant is figured under the name of I. florentina that is identical either with florentina or albicans as they are generally known. The two names should, however, be attached to two quite distinct plants. The former, as represented in the " *Botanical Magazine*," flowers early with the common form of I. germanica, has a distinctly blue-grey tinge in the falls, scarious spathes, and a certain number of straggling, whitish hairs on the inner side of the haft of the standards. The foliage is relatively narrow for the size of the plants, and the pedicel or branch that supports the lowest of the four flowers that the inflorescence contains is at least three inches or four inches in length. Attempts have been made to show that this iris is a seedling form of I. pallida, and the scarious spathes, together with the presence of hairs at the base of the standards, lend support to this view, but with me, at any rate, all attempts to self-fertilise the plant have been fruitless, and the only way to settle the question would be to raise and flower plants from self-fertilised seed. The origin of the plant is shrouded in mystery, and, after searching through many herbaria, I have never yet succeeded in finding any authentic wild specimen of this plant. Another error connected with this iris is that it is exclusively the plant whose dried rhizomes form orris root, but among several importations of rhizomes from the neighbourhood of Florence, cultivated by the late Sir Michael Foster, Messrs. Barr & Son, and here in my garden, not I. florentina, but I. pallida in various forms, has invariably made its appearance.

From this Iris florentina another species, which is found in Spain, in the neighbourhood of Cadiz and Almeria, was first separated by Lange in 1860, under the name of I. albicans. It is clearly distinguished by the fact that the flowers are nearly sessile on the stem, by the snow-white colour of the flowers, by the entire absence of hairs at the base of the standards, and by its spathes, which are more or less scarious only in their upper halves, when the flowers open. It flowers, too, considerably later than I. florentina, and the broader leaves with their curious tendency to twist give the plant quite a different appearance. This Iris albicans is doubtless the plant illustrated in Redoute's "*Liliaceae*," *t.* 23, under the name of I. florentina.

A third white-flowered iris, which, unfortunately, is not common in cultivation, is I. kashmiriana, a species with milk-white flowers and hairs at the base of the standards. For some reason or other it is a difficult plant to manage here. Rhizomes sent direct to me from Kashmir flowered well in their first season, but since then they have dwindled and disappeared, although a purple-flowered form of I. germanica, which was sent with them, flowers well and increases rapidly. Fortunately there is now obtainable a hybrid of this species, raised by Sir Michael Foster, and lately distributed under the name of Shelford variety of I. kashmiriana. Its flowers are of great substance, slightly tinged with blue, and it would scarcely be surprising to find that it is a cross with I. pallida dalmatica, for the shape of the flowers and the inflorescence are very similar. So far, however, the hybrid has proved infertile, and the problem of its parentage remains unsolved.

Another plant—from Beluchistan—which flowered with me for the first time this year, proved to have beautiful, large, white flowers, delicately tinged with blue. The long, pointed, green spathes separate it at once from the above-mentioned species, and it is possible that it is only a form of Iris Bartonii, which came from Kandahar. The fact that white irises are very commonly used in the East as decoration in grave-yards makes it difficult to obtain really wild specimens, and increases the difficulty of determining their original habitat and distribution.

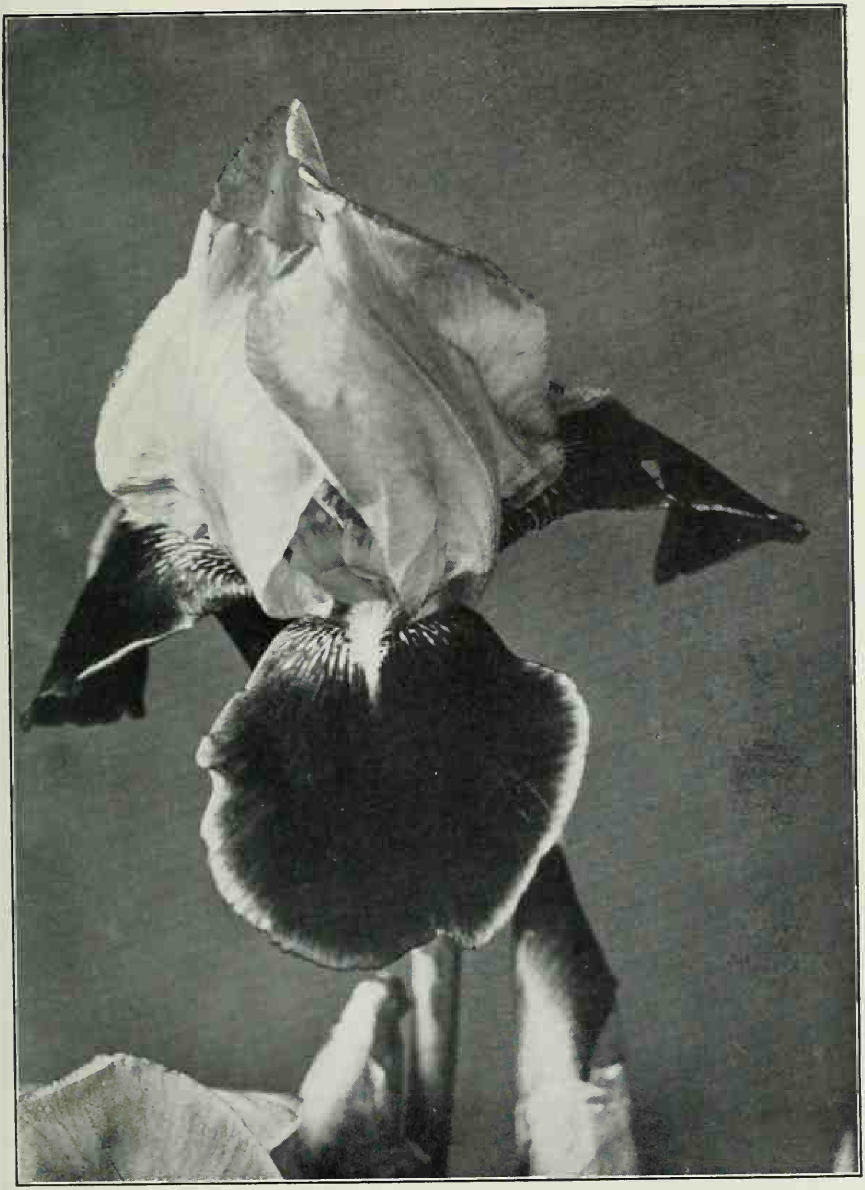
Besides these plants, there is another that it would be extremely interesting to obtain, and which may very likely exist in Egyptian gardens, namely, the white form of Iris Madonna, specimens of which, together with others of the blue form, which has been in cultivation for some years, were obtained on Mount Saber in the Yemen district of Arabia by Botta in 1837. A few white-flowered plants were, I believe, obtained by Messrs. Dammann, who introduced Iris Madonna to cultivation, but I have been unable to obtain specimens or to trace them. I should be grateful if anyone possessing such an iris would communicate with me. The typical blue form of I. Madonna is undoubtedly a true germanica, and a handsome garden plant.

There is also said to exist a white form of I. germanica, but so far I have never seen under this name any plant that was not either I. florentina or I. albicans, both of which differ from I. germanica in other respects than that of colour.

Some white Pogoniris.

(" *The Gardeners' Chronicle* "—*November 23rd*, 1918.)

Our knowledge of the various white-flowered bearded irises is still in a fragmentary and unsatisfactory condition, but it may nevertheless be worth while to put on record such data as have by degrees been accumulated. The investigator into the origin and relationship of the various species and forms who pursues his enquiries in England is greatly hampered by the fact that it is extremely rare for the known forms of white, bearded irises to produce apparently sound seeds in our gardens. Moreover, it is by no means the case, unfortunately, that these white irises will always continue to flower here. Newly-imported rhizomes seem to bring with them sufficient vigour to flower in their first year, but afterwards they seem to deteriorate and fall an easy prey to disease of one kind or another. That this is largely a question of soil and climate is shown, I think, by the fact that in the garden of my friend,



IRIS DOMINION

See page 268

IRIS KÆMPFERI

See page 8 and index

Monsieur Denis, of Balaruc-les-Bains, Hérault, several of these irises, which decline to flourish here, not only increase and continue to flower, but even produce sound seeds. I am indebted to M. Denis for many of the facts contained in the following notes.

There is another circumstance which has vastly increased the difficulty of arriving at anything like a satisfactory account of these white irises, and that is that in the East, and especially among the Mussulmans, white irises are frequently planted in grave-yards. I am not aware that the custom has any definite religious significance, but it seems to be undoubtedly a fact that I. albicans is a native of the mountains of the Yemen district of Arabia and that it has been carried thence by the disciples of Mohammed almost as far as their religion itself has spread. I. albicans was first described botanically as growing near Almeria, in Spain, whither it had doubtless been imported by the Moors, who took it also into Sicily and into Asia, whence it has more than once been sent from Samsun and Mardin, as well as from Persia. From Spain it was apparently conveyed to America, where it has escaped from cultivation and become more or less naturalised—in Mexico and in more than one place in South America. It has also spread from Spain to the south of France and given rise to the name of the village of Les Onglous (apparently Provençal for irises), a short distance to the west of Cette, on the coast of the Mediterranean. There it grows in millions on the sandy banks among the vineyards, where the vines grow by the seashore to within twenty feet of high tide. M. Denis informs me that the plants, which I took to his garden from Les Onglous, never set seeds, though others have done so here on rare occasions. On the contrary, plants from Mardin, when pollinated from the Les Onglous plants, seed readily, and the seedlings have shown that this iris reproduces itself from seed without producing any appreciable variations. This is precisely what we should expect of an albino form, and fortunately, in the case of I. albicans, we possess in I. Madonna the purple-flowered species of which it is the albino form. I. Madonna was introduced from Arabia some ten or twelve years ago, and I do not think that anyone who will compare the growth of these two irises will doubt that they are mere colour forms of the same species.

Other albino irises, such, for instance, as the white form of I. tectorum, breed absolutely true from seed when self-fertilised, and I have little doubt that sooner or later we shall possess white forms of all our purple irises of the germanica and pallida groups. Some years ago I found in Dalmatia a tall, white pallida, which, however, has a very weak constitution in our English climate, and though still alive, persistently refuses to flower here. There is also in existence a white form of the well-known I. Cengialti, and a few years ago there appeared here a fine white form of the dwarf pallida of the eastern coast of the Adriatic, which promises to prove an admirable garden plant.

The Central European I. aphylla has also given me a white form, though in this case it is hardly a pure albino.

The well-known I. florentina is obviously nothing but a quasi-albino form of a purple germanica. I have obtained from the neighbourhood of Florence a slender, dark, black-purple germanica which closely resembles florentina in its habit, and, moreover, it is not at all unusual for streaks or blotches of purple to appear in the flowers of florentina.

There is also to be obtained a so-called germanica alba, which is different from florentina and is the albino of some other of the numerous forms of germanica. I have also another form which I found in a roadside garden on the way up from Mattuglie to the top of Monte Maggiore, above Abbazia, in Istria. This has larger flowers than those of florentina, and a white instead of a yellow beard. In shape it recalls germanica atropurpurea and may be an albino sport of that variety.

These various forms are sufficiently puzzling, but when we come to the various white irises of the North-west Frontier of India our difficulties are vastly increased. It is these irises especially which will not succeed after more than one or two seasons here, and I can only give M. Denis' experience of plants which have succeeded with him though they have failed with me. I. kashmiriana appears to be the white counterpart of a pale lilac-purple iris which is occasionally sent home from the neighbourhood of Srinagar, but which must not be confused with the Kharput form of germanica. The latter has become naturalised there and is far more common because more vigorous. I. kashmiriana is distinguished from the white irises already mentioned by its long, narrow spathes, which remain green till the flower has faded. This same character appears in I. Bartonii, which I took to be only a form of kashmiriana, but which M. Denis informs me comes true from seed. It is a smaller plant than I. kashmiriana, and its flowers are of a yellowish white, sometimes veined or suffused with purple. It is remarkable in having a number of long hairs on the inner side of the haft of the standards whereas in kashmiriana there are only three or four short hairs. The original plants of Bartonii came from Kandahar, and M. Denis tells me that others which I received from Quetta and Abbottabad are slightly different forms and that all three reproduce themselves approximately true from seeds when self-fertilised, and remain distinct from I. kashmiriana.

In this connection it should be remembered that the real I. kashmiriana is seldom in cultivation in England. The forms obtainable under the name of " Shelford variety " or " Miss Willmott " are, as Foster himself told me, of doubtful parentage, and M. Denis finds that he obtains from them forms that are obviously akin not to kashmiriana but to mesopotamica.

Some Rare Irises.

(" *The Gardeners' Chronicle* "—*June* 14*th*, 1913.)

Through the kindness of Mr. C. G. Van Tubergen, of Haarlem, I have lately been able to see flowers of some species of Oncocyclus Iris, which are, unfortunately, not often in cultivation. As usual, the flowers came from new importations, and the plants will probably dwindle in the perplexing fashion of their kind.

Iris iberica is perhaps one of the best known and easiest to grow of the whole Oncocyclus group, but it is not usually known that besides the usual form, in which the ground colour, both of the standards and of the falls, is a pale greyish-white, there exists another variety in which this ground colour is a clear yellow. So long ago as 1863, this plant was described under the varietal name of ochracea and figured in " *Gartenflora*," *o*. 386. The plants which I saw growing in Haarlem were exceptionally vigorous for I. iberica, and the flower which I received was magnificent. The standards are of a clear yellow, with a few faint purple veins and dots on the lower part, while the falls are of the same shade of yellow, so closely blotched with dark brown that the ground colour is almost obscured. The signal patch is of a velvety-black.

The plants just described came from the neighbourhood of Van, in Armenia, and from the same neighbourhood there was also received an importation which has proved to contain I. Barnumae and its yellow-flowered counterpart. I. Barnumae is one of the most distinct of the Oncocyclus group, for it is in fact the only one that is self-coloured and not blotched or dotted with one colour upon another. Moreover, there is hardly any signal patch. Another curious point is that the beards are in some cases of a dull purple colour, and in others yellow. So far as we know the yellow form has always a yellow or orange tinted beard, but this agrees with what we know of such European species as chamaeiris, Reichenbachii, etc. In yellow-flowered forms the beard is always yellow, but in purple flowers it may be either yellow, white or purple—a phenomenon which was also recently recorded as occurring in wild plants of I. illyrica.

Whether the yellow-flowered form of I. Barnumae is identical with the plant to which the name of urmiensis was given is perhaps open to some doubt, but in any case Sir Michael Foster saw no reason to separate them, and further consideration has failed to show any real points of difference. They may differ as one local colony of I. chamaeiris differs from another, but only in such unimportant details that we must hesitate to give specific rank to both. In the same way it is hard to see how I. Mariae can be separated from I. Barnumae, though in this case it is curious to find the same species occurring near Van in Armenia, and not again until the Egyptian frontier is reached in southern Syria.

The sight of a flower of I. paradoxa always causes regret that the plant is so difficult both to obtain and to cultivate, and this regret is only increased when the form proves to be that named Choschab, from the locality in which it was first found. In this the standards, instead of being blue as in the type, are veined with deep violet blue on a silvery white ground. A recent importation from the Aderbaijan province of northern Persia has once more provided specimens of this unique flower.

Two other Oncocyclus Irises have recently been in flower here side by side. The rhizomes were received from Herr Siehe in 1911 under the names of I. Sprengeri and I. Elisabethae. The former is perhaps a little smaller, but otherwise the plants and flowers cannot be separated. The veining on the standards of the latter was perhaps rather denser than on I. Sprengeri, but the variation was only such as is constantly found among seedlings of any iris species. I still see no means of separating these two forms from the plant which Foster originally described as I. Ewbankiana.

Some New Irises.

(*" The Gardeners' Chronicle "—July 12th,* 1913.)

The hybridisation of species is at best an unsatisfactory suit. It may be argued that the success or failure of attempts at crossing plants which seem to be only very distantly related to one another may throw some light on the real relationship between them, but it is at least doubtful whether any inference can be drawn from the non-success of such a cross. For instance, it is known that Sir Michael Foster tried many times to obtain hybrids of Iris tectorum, and similar attempts were also made in the south of France, where there is usually more chance of obtaining sound seeds of irises than in our variable climate. These attempts remained fruitless, and it seemed as though I. tectorum would not unite with any other species. More recently however, this pollen has fertilised the Loppio variety of I. Cengialti and also a form of chamaeiris.

In both these cases the resultant plants are puny—at any rate in England, though I hear that I. Lop-tec is doing well in Hérault. Moreover, they have proved so far to be sterile, both to their own pollen and also to the pollen of either parent. It is a curious fact that such plants go to the trouble of forming capsules in which the seeds do not develop. Even a hybrid between such apparently close relations as I. Korolkowi and I. stolonifera produces huge capsules five inches long which contain not a single seed, though the meaning of this apparent waste of energy is hard to see.

It is possible that hybridisation only has a stunting and debilitating effect when species are used that are really widely separated. At any rate, several instances of hybrids which are far more vigorous than either of their parents have occurred here this year.

Early in May I was surprised to see that a number of plants which were producing masses of narrow leaves and which had the appearance of being some form of I. sibirica had no signs of flower stems, as all the other sibiricas had. Closer examination showed, however, that numbers of spikes were developing, and I looked with some curiosity to the reference for the number on the label. To my astonishment the plants came from a cross between I. tenax, a Californian species, and I. Wilsonii, the taller of the two yellow-flowered relatives of I. sibirica, introduced a few years ago from China. At the beginning of this month these plants were literally covered with flower spikes and were the most vigorous and floriferous in my garden, each seedling plant producing twenty or more stems. The leaves are of a pale green, distinctly ribbed, about three feet long by half an inch wide, linear in the lower part and then tapering gradually to a point. The stems are a little longer than the leaves—or at any rate, rise above their drooping tips—and are slender and wiry. They are not, however, solid like those of I. tenax, but have a small hollow running down the centre, a feature which is characteristic of I. Wilsonii. In the vast majority of cases the stems bear a single terminal head of two flowers, though a lateral flower occasionally develops about four or six inches below. The spathes are long and narrow, as are those of both the parent plants, and are persistently green even when the flowers have withered.

The flowers resemble in shape those of I. tenax except that the standards are not erect, but incline outwards, though not to the extent of those of I. Wilsonii. It is remarkable that the flowers have that curiously mottled appearance which is also found in another hybrid between the sibirica and Californian groups—namely, I. Clarkei, crossed with pollen of I. Douglasiana. On the falls the white ground is nearly obscured by suffused colour from the close-set, deep purple veins. Near the end of the styles the ground colour becomes a deep yellow or orange, as in the case of I. Wilsonii. The standards have to a remarkable extent the curious, mottled appearance, an effect which is apparently produced by red-purple veins and suffused colour on a slightly bluer ground.

The short perianth tube is purple as in the mother plant, and what is more surprising is that the plants are apparently fertile even to their own pollen. At any rate, the capsules are now swelling and have not the puffy appearance that usually betrays the absence of contents.

Another hybrid which surpasses in vigour both its parents comes also from I. tenax, the pollen parent being in this case I. Purdyi. This has leaves of considerable substance and a polished upper surface, not unlike those of I. Douglasiana, about two feet long and half an inch wide. The leaves do not stand erect, but droop gracefully round the stems, which are about twelve or fifteen inches high, closely covered with large bract-like leaves which entirely conceal it. In some cases there is a lateral branch of some inches in length besides the terminal head of two flowers. The flowers are in shape not unlike those of a large I. tenax, being veined with a faint pinkish-mauve on a white ground. In strong sun the colour soon fades to a soft grey, and the old and new flowers thus form a striking contrast. This plant produced apparently fertile pollen, and capsules are now developing with every appearance of being sound.

It is curious that some irises seem to produce true albinos which breed true, such as I. tectorum alba and I. orientalis alba, which is largely grown under the name of Snow Queen, while others produce white flowers from which indications of the purple shade are not entirely absent. Of these latter, obvious examples are the albo-purpurea variety of I. laevigata and the white form of the true European sibirica. The flowers of the latter have usually some slight tinge of mauve, and that the purple element is there has been strikingly proved by hybridising one of these white sibiricas with the yellow I. Wilsonii. The resultant plants are very similar to the true sibiricas. The tall, hollow stems raise their heads of three or four flowers well above the foliage, and the colour of the flowers is, as far as I know, entirely new among sibiricas. The falls have rounded blades, which are held out stiffly and not allowed to droop. They are veined with pale sky-blue on a creamy-white ground, which, near the margin, is entirely obscured by suffused colour from the veins. Near the end of the styles the white ground is more conspicuous and the veins become violet. Further back still the ground becomes yellow, and the yellow colour of the haft of the falls contrasts with the blue of the styles and standards. This plant seems also to be readily fertile, though it still remains to be seen whether the capsules now developing contain sound seed. The hybrids are very vigorous, for each seedling plant has produced from ten to twenty flower stems.

A hybrid which is distinctly less desirable than either of its parents has resulted from the crossing of I. chrysographes with pollen of I. Forrestii. The plant is very similar to I. chrysographes, but the wonderful velvety richness of the latter has given place to a violet-blue colour. The flower retains, however, the bright yellow reticulations on the falls from which I. chrysographes takes its name.

Another new hybrid which it is unnecessary to describe beyond saying that it is an exceptionally vigorous sibirica, with as many as eight flowers on a stem, has resulted from crossing I. Wilsonii with pollen of typical I. sibirica. The shape of the flowers is somewhat different, especially in the standards, which are unusually large, but in other ways the influence of I. sibirica seems to have entirely dominated that of the Chinese mother. It will be interesting to see whether the plants prove to be fertile and what the second generation will give us.

Some New Iris Hybrids.

(*“ The Gardeners' Chronicle ”—April 27th,* 1912.)

Complete dominance does not seem to prevail when two widely-separated species of iris are crossed together. On the contrary, each character of the hybrid seems to be a compromise between the corresponding characters in the two parents. Moreover, the investigation of the results in subsequent generations is rendered impossible by the complete sterility of the hybrids, both with their own pollen and with that of either of the parents.

It is, perhaps, premature to base any conclusions on a few instances, but the results that I obtained by crossing I. chamaeiris with pollen of I. Korolkowii and I. Cengialti with pollen of I. tectorum have been confirmed by a fresh cross which I now propose to describe.

In 1909 I crossed a flower of I. Clarkei, which comes from an elevation of about ten thousand feet on the Himalayas in the neighbourhood of Darjeeling, with pollen of a form of the Californian I. Douglasiana, which has flowers of a pale pinkish-buff colour. I must confess that I hardly expected to obtain any result from a cross between such dissimilar species. However, when the flowers appeared in due course in June, 1911, there was no doubt that the two parents had combined to form an entirely distinct new iris. In the first place the flowers are of a curious colour, that can best, perhaps, be described as crushed strawberry—that is to say, the pinkish-buff of the pollen parent. I. Douglasiana has almost, but not quite, obscured the blue-purple of I. Clarkei, the seed parent. The bluish tinge is obviously present, and the colour is quite different from that of I. Douglasiana.

Another obvious compromise between the characters of the two parents is found in the leaves. Those of I. Clarkei have a peculiar polished upper surface and are glaucous beneath. Moreover, they die away entirely in early autumn. Those of I. Douglasiana are of a thick, leathery texture, deep green in colour, persistent through the winter, only dying away when the fresh growths have developed in spring. They are usually more or less glaucous, at least in the early stages of their growth. The leaves of the hybrid seem unable to decide which parent they intend to follow, for the central leaves of a tuft are often entirely glaucous, while the outer leaves of the same tuft have the curiously dissimilar surfaces of I. Clarkei.

This was the state of the foliage of my half-dozen plants when I began to observe them closely, but I am sorry to say that this was not until I found flower-spikes, so that I do not know what appearance the leaves have in the early stages of their growth.

When I. Clarkei lost its leaves in September the hybrid was still quite green and vigorous, and I wondered whether it was going to follow the example of I. Douglasiana and keep its foliage until the spring. At first it seemed as though this would be so. But not long before Christmas the leaves turned yellow, and have now withered entirely away.

Another curious feature of the hybrid plant is that its flowers are mottled on the blade of the falls, with a number of fine dots of a deeper shade of pinkish-lavender though there is no trace of any such dots on the flowers of either of its parents. The standards also are mottled in the same way but more faintly. They are not held erect as in I. Douglasiana, nor yet are they so much depressed as in I. Clarkei. They have wavy edges, which seem to result from the struggle between the plane surface of the standards of I. Douglasiana and the long, deeply-channelled haft of I. Clarkei, in the same way that the mottling appears to be the consequence of the competition for dominance of the pinkish-buff of the pollen parent and the deep blue-purple of the seed parent.

Note on Irises.

(" *The Garden* "—*April 20th,* 1907.)

Since you found parts of my letter of a fortnight ago of sufficient interest to be reproduced in " *The Garden,*" I think you will be pleased to hear that since then the display has been continued by patches of I. reticulata, which have flowered well this year, and by sindjarensis, which, though comparatively easy to grow, loses, perhaps, in effectiveness by the fact that the flowers, being sessile, are too closely packed on the plant. Besides the type of sindjarensis, which, by the way, is extremely variable in many shades of blue, I have had the white form in flower. Its crest is yellow and the style-branches are faintly tinged with blue. A near relative (assyriaca) is also in flower now, and is even finer. The foliage is stronger and of a somewhat yellower green, and the flowers are more distinctly tinged with blue, being of much the same colour as I. florentina.

Willmottiana is also in flower, and this with its deep green, white-edged, shiny leaves, and deep lavender and violet flowers conspicuously blotched with white, is perhaps the best of the group. The plant has had five blooms, and to-day no fewer than four were fully expanded at once. Tubergeniana was in flower at the beginning of the week. Its bloom is small but of a good yellow colour, and interesting by reason of its conspicuous hairy linear crest.

Galatica is presumably a relative of I. persica, which it resembles in that the falls have large wings which clasp the style-branches. Its colour is poor, a dull yellowish-brown tinged with purple, the falls being tipped with a dark purple patch. There are also in flower two of the rarer forms of orchioides, alba and coerulea. In both there are four parallel lines of dark green running along the falls. In alba they change to a paler shade of green, which is suffused over the crest and over the centre of the reflexed portion of the falls, while in coerulea the signal patch and crest are bright yellow, which shades through green into blue, which is the colour of the edges of the reflexed portions of the falls. Both forms are beautiful, and the plants have the advantage over sindjarensis in that each flower has a distinct stalk of its own.

Species of Bearded Irises.

(" *The Gardeners' Chronicle*"—*September* 11*th*, 1915.)

After reading Mr. A. J. Bliss's article on bearded iris species on *p.* 37, there are one or two points to which I should like to draw attention.

The first is that I. aphylla is only a name that covers a considerable number of local forms, of which we should perhaps have known a little more if this great war had not broken out. At the end of last July I was just on the point of starting on a journey which would have taken me to the homes of many of the forms of this widely-distributed Central European species. My plan was to go south from Berlin through the Hartz Mountains to the neighbourhood of Halle, and then on into northern Bohemia, all districts in which forms of I. aphylla are found. From there I intended to make my way to Breslau and southern Silesia, and then through Galicia and over the Carpathians into Hungary. I. aphylla is found in the north of Hungary, in the Tokai district, and also in Transylvania. However the prospects of making such a journey in the near future do not seem promising and in the meanwhile we can only remember that among the various forms of this iris there are innumerable variations in colour and shape and in that coloration at the base of the growths on which Mr. Bliss lays stress. Early this year there came up in my garden here many shoots of a form of this iris from Ermihalyfalva, in Hungary. The deep, purple-violet tips of some of the young shoots were really an astonishing sight, and these plants now retain their deep colour at the base. Others were less deeply coloured, while a few were wholly green.

As far as I can see, this colour at the base is a character unconnected with any other character, and occurs both in this species and in I. variegata in the most capricious manner. It would doubtless be interesting to investigate the question by breeding experiments begun with wild plants from known localities and not with the garden forms with which Mr. Bliss has conducted his interesting experiments.

I. aphylla also varies very much in the colour and appearance of the beard, and I cannot believe that in the present state of our knowledge of the species it is safe to draw any conclusions as to the probability or possibility of any particular type of beard appearing or not appearing among seedlings of I. aphylla.

The colour of the beard of an iris appears to be a most untrustworthy character. The best example is in I. stolonifera, where some specimens have beards of bright yellow and others of a brilliant electric blue. Unfortunately, the colour seems capable of changing in the same plants from year to year, and is often a compromise between the two extremes, being blue in front and yellow further back. On the contrary, I have known instances where the crossing of a blue with a yellow beard produces a beard of a brownish tinge.

We must hesitate, I think, to accept Mr. Bliss's suggestion that I. albicans is not merely an albino, but a hybrid of I. Madonna. I can hardly believe that he would make the suggestion if he knew I. Madonna or if he had grown the two plants side by side for several years. They are identical except in colour, and moreover, it is hardly likely that hybridisation with another species should have taken place in so remote a neighbourhood as the top of a mountain in the

Yemen district of Arabia. Specimens of the two plants, gathered there nearly a century ago, still exist in the Paris Herbarium.

Another point which we must not forget is the difficulty of saying that any particular plant is the type of I. pallida. I feel certain that I could show Mr. Bliss specimens of I. pallida from known localities, some having " hanging " falls and some in which the blades extend almost horizontally. Foster's dark reddish form from Monte Brione has spreading falls, and I only wish Mr. Bliss could have been with me on a memorable afternoon when, on a rocky cliff not many miles from Ragusa, on the Dalmatian coast, I found many thousands of specimens of Iris pallida varying in colour from deep violet or blue-purple through pink or reddish-purple shades to pale mauve and even white. From Bozen I have two pallidas, of which one has spathes of silvery-white, while in the other the spathes, though entirely scarious, are of a pale brownish tinge. Both these again are different from forms from Riva and Como, while I have myself found others at Bollunz and Popecchio to the south of Trieste, on Mount Veljun in Croatia, and on the Velebit range further to the south. The differences are endless. Some have green and some glaucous leaves, while in some there is a distinct pink tinge at the base of the leaves.

The so-called I. pallida dalmatica has widely-spreading falls, but I am inclined to doubt whether the plant is a native of Dalmatia. From Trieste to Ragusa the forms of pallida increase in size and vigour, and if the increase continues regularly we might expect to find " dalmatica " in Albania or even as far south as Mount Taygetus, in southern Greece, where I have reason to believe some fine irises exist.

It can hardly be allowed, therefore, that I. pallida is " certainly homozygous " for the character of " hanging " falls.

Another point which makes it difficult to follow Mr. Bliss's argument is that there are several white germanicas. The so-called I. florentina is the best known, and its dark, black-purple counterpart is used near Florence for the manufacture of orris root, along with a pallida and, strange to say, albicans, while " florentina " itself seems unknown there. The variety atropurpurea has a white counterpart that grows freely on the castle hill of Beaucaire, which faces Tarascon across the Rhone, while I have two others, of which I have no purple counterparts, one from Metkovic at the mouth of the Narenta, and another with a white beard that I found growing in a wayside garden at Mattuglie on the way up from Fiume to

Monte Maggiore. The last is, I think, the finest, and differs from all the others by having an almost entirely white beard.

Once again this year both I. albicans and Madonna have failed to mature any seeds in the pods they had formed, and I am as far as ever from knowing whether these two interesting plants will reproduce themselves unchanged from seeds as I should expect them to do. Mr. Bliss's seedlings of albicans x macrantha do not surprise me in the least, if we may assume macrantha, as other forms of germanica, to have sprung from I. aphylla. Some forms of the latter have flowers of a pale pinkish-purple, and I have also a form of I. germanica from the Greek island of Cephalonia, which has flowers of a distinctly pinkish-purple. The combination of the white of albicans with the reddish-purple which occurs in I. aphylla would give a " pale rose-mauve," while the yellow-tipped beard of albicans would combine with the blue of aphylla to give the " brown-tipped " beard.

It seems, indeed, that the more we learn of the infinite variety to be found among local forms of the known species of iris, the more reluctant we shall be to accept Mr. Bliss's theory of the existence of an unknown species, presumably in Europe or at any rate on the shores of the Mediterranean, which has hitherto escaped the notice of collectors in the field and of which no trace appears to exist in any of the great herbarium collections.

The interesting question is at once raised as to whether it is possible to start with hybrids that are probably the outcome of several generations of hybrids—for this appears to be the parentage of most of our garden bearded irises—and by means of breeding experiments to get back to the types of the species between which the original hybrids were made artificially or occurred in nature. Approaches to the wild plants may undoubtedly be obtained, but do we ever get typical plants in which there is no trace of more than one species? From my own experience I am inclined to doubt it.

Irises for the Rock Garden.

(" *The Gardeners' Chronicle* "—*November 2nd*, 1912.)

English rock gardens usually contain few representatives of the genus Iris, although there are many species admirably adapted for cultivation in positions that, besides affording some shelter, also bring them up to a level with the eye. It may be that the reason for this neglect of irises in our rock gardens may be traced to the fact that the mountains from which the majority of the commonest rock plants come, namely, the Alps and the Pyrenees, contain practically no alpine representatives of the genus. It is true that I. xiphioides, misnamed the English Iris, grows in the alpine meadows of the Pyrenees, but it is scarcely what we understand by a rock plant.

Further afield, however, many dwarf species of iris are to be found—in the Balkans, the Caucasus, the mountainous regions of Asia Minor, the Altai district and Turkestan, and even up to seventeen or eighteen thousand feet in Tibet. The iris which has the distinction of growing at this elevation. the highest-known level, is the floriferous species I. Potanini, which, unfortunately, has never apparently been in cultivation. It has small tufts of narrow and curiously blunted leaves only an inch or two in height, clothed against the rigours of the climate in dense wrappings of curling fibrous remains of the leaves of former seasons. From each small tuft of leaves springs a flower much resembling that of I. pumila, either of a yellow or a purple colour. No stem develops, so that the ovary remains in the protection of the leaves, while the flower is raised on a long perianth tube.

But even if I. Potanini is still an unattainable ideal of a rock-garden iris, we need not despise its European cousin the true I. pumila, which in some of its forms is almost as diminutive. It is true that the real plant is hard to obtain, but anyone who has seen a number of collected plants in flower will not wish to be without it. Each plant produces flowers that are different from those of its neighbour, and all colours from pale sky-blue to deep red-black are found, together with others in which the prevailing colour is yellow, either with mahogany or green markings. To do well I. pumila needs a sunny position in soil rich in lime.

I. pumila has another cousin in the Balkans namely I. mellita, which differs chiefly in that its spathes are rigid and sharply keeled, while those of I. pumila are membranous and hardly at all keeled. This keeled character of the Balkan iris is a curious fact. Besides being the chief distinction between I. pumila and I. mellita, it also distinguishes I. Reichenbachii from I. chamaeiris, and, what is still more curious, I. Sintenisii from I. spuria. To my mind the flowers of I. mellita are still more pleasing than those of I. pumila, for there is a clearness of colour and a sharpness and delicacy in the veining not found in the Austrian plant. The colour of I. mellita is either a curious chocolate-purple set off by a beard of thick-set silky hairs tipped with electric blue, or apparently it may be a clear yellow, though of this form I have only so far seen herbarium specimens. A form of this iris, in which the young leaves are edged with red, as are those of some of the forms of I. germanica, *e.g.*, Amas and (especially) Kharput, has been described under the name of rubro-marginata, though it seems at most to be a sub-species or local form.

I. Reichenbachii is a Balkan species as variable in size as I. chamaeiris in the south of France, and some of the forms from the higher levels are delightful dwarf plants with clear yellow or purple flowers, differing chiefly from I. mellita by the shorter, broader spathes, and by the fact that the stem is always developed.

In Europe, the so-called I. arenaria is not an Alpine plant, but it is probable that it is identical with I. flavissima, which is common in the Altai mountains. Short-lived though the display is, it is hard to find anything in a rock garden that will surpass the brilliance of a close mass of a number of flowers of this bright yellow iris with its orange beard. A light rich, sandy soil is necessary, and the plants are perhaps best raised from seed. The rhizomes run in all directions, and in a year or two from the time the seedlings appear numbers of flowers may be expected.

It might be thought improbable that a plant should be found in Transylvania, and then not again until we reach the Altai, but curiously enough, there appears to be at least two other species of iris which have the same curious distribution, namely, I. ruthenica and I. humilis. The rare examples of the latter species from the Altai have, it is true, been named I. Ludwigii, but an examination of the type specimens in the St. Petersburg herbarium has left little doubt in my mind that these are identical with the European I. humilis. This plant is practically a stemless I. graminea, but it is scarcely attractive and, as it does not always flower freely, it is perhaps hardly worth a place in the rock garden. I. ruthenica, however, with which apparently it is found growing both in Transylvania and in the Altai, is a very valuable plant. In its best forms it grows into close masses of grassy foliage which are literally covered in May with the white-blotched, blue flowers proceeding from the pink-flushed spathes. With regard to this iris a caution is necessary. Never attempt to move it except while growth is active in summer, and obtain new colonies of it from seed rather than by transplantation.

For large rock gardens nothing can surpass some of the Californian irises, which are so little known but which are not really difficult to manage if a limestone soil is avoided and attention is paid to the caution just given as to the cultivation of I. ruthenica. I. Douglasiana is almost too vigorous for all but the largest pockets, but I. Purdyi, I. bracteata, I. macrosiphon and I. tenax are all worthy of places. The diverse and delicate colourings to be found among those irises are endless, and the general rule that multiplication must be by seeds rather than by division has its compensation in the surprises to which it gives rise. I. bracteata, which in its typical state has yellow flowers veined with brownish-purple has already given me several forms, some of which are approaches to crimson, while one is a delightful colour that may best be described as old rose. A descendant of the second or third generation of what was originally a cross between I. Douglasiana and I. macrosiphon has flowers of a pure white, conspicuously veined with violet purple, and there seems to be no end to the colour forms to which this valuable group may give rise. What is still more extraordinary is that the colours all seem to harmonise together and to avoid those crude clashes which from time to time offend the eye among the commoner alpine plants.

The Oncocyclus Irises of the Caucasus and Cilicia, I. iberica, I. paradoxa, I. lupina (*syn.* Sari) and others are probably real alpine plants, but, alas, our summers are not hot or dry enough to ripen the rhizomes, and it is open to doubt whether they will ever become permanent inhabitants of our rock gardens.

It is different with the bulbous species of the reticulata and Juno groups for these will live on year after year and increase if a few simple rules are not ignored. The members of the reticulata group should be lifted every year or two, and treated for the disease which otherwise is liable to carry them off in a veritable outbreak of the Black Death. No bulbous plant which at some period of the year loses all its roots as does I. reticulata can resent an annual shifting, provided that the growth has been allowed to ripen off naturally and provided that the bulbs are not kept too long out of the ground and not allowed to weaken themselves by starting into growth before they are returned to the soil.

Juno Irises on the other hand, are undoubtedly weakened by any attempt to lift or move them. It is impossible to do this without breaking some of the fragile roots, and from these breakages some delicate species, such as the typical I. persica, rarely seem to recover. These must therefore be planted in the sunniest and best-drained position available and given good rich soil, without new manure. If the surface slopes sharply to the south, and so throws off the rain and at the same time allows the sun's rays to penetrate to the bulbs, these should go on increasing in vigour, provided that they are judiciously fed by top dressings of leaf-mould and suitable artificial manures. Provided that the drainage is perfect, the plants seem to do better in a rather heavy loam than in too sandy a soil.

Notes on Irises.

I. TECTORUM ALBA. I. OLBIENSIS X KOROLKOWII.

(*" The Gardeners' Chronicle "—July 4th,* 1908.)

IRIS TECTORUM ALBA.

This iris, which is one of the most delicate and beautiful of all, may easily be raised from seed, and the resulting plants are all white-flowered. Plants raised from seeds ripened in 1906 are now in flower here, having stood the winter well though entirely unprotected. The white variety differs, as far as my observations go, from the type in having a stem that is only one-headed, the spathe usually containing two buds, while I. tectorum always has a considerably taller stem, which branches to form several heads. I should be glad to know whether anyone has found that the white variety produces similar branching stems.

IRIS OLBIENSIS x KOROLKOWII.

This is an interesting hybrid of a claret-red form of olbiensis, often known as Socrates, crossed with a form of I. Korolkowii, the latter being the pollen parent, and it came into flower for the first time in May. The plant combines the characteristics of both parents in practically equal degrees. The foliage is that of olbiensis except that the bases of the shoots have the reddish-brown coloration of most varieties of Korolkowii. The flower is of olbiensis shape and colour, in so far as the groundwork is concerned, but both standards and falls are conspicuously overlaid with the black-brown veinings of Korolkowii, and they run together on the falls to form a black signal patch. The dingy yellowish beard is also the product of the combination of the bright yellow of the female parent with the black of the male.

IRIS VAGA.

I have this year noticed an extraordinary variation in colour in the beard of this iris. In 1907 I had about twenty plants in flower, some having bright yellow beards while in others the colour was a bright vivid blue. The difference in the general appearance of the flowers was quite noticeable by even the most casual observer. I carefully labelled each plant and, when I lifted them, I separated them according to the colour of the beards and replanted them in different beds. This year I had over thirty spikes of flower on these two beds, but in no case was there a bright yellow beard. Every flower was of the blue beard variety, though in some cases there were a few dull yellow hairs far back beneath the style-branches.

Iris vaga and I. Leichtlinii are usually supposed to differ chiefly in the colour of the beard, but if this colour is liable to variation from year to year how can we tell whether a given flower is I. vaga or I. Leichtlinii ?

Change of Colour from Year to Year.

(" *The Gardeners' Chronicle*"—*June 19th,* 1909.)

For some time past I have been inclined to suspect that iris flowers vary from year to year on the same plants, even when the latter remain undisturbed in the same spot. Last year I made careful notes of some dwarf yellow seedlings, with a view to eliminating muddy colours and keeping only the purest. This year the notes do not correspond in the least, and those plants which seemed the best last year have this year differently coloured flowers. Last autumn the plants were left undisturbed, and this year the two batches produced blue and yellow beards respectively, as I noted them in the autumn of 1907 !

Can anyone suggest an explanation ?

Some Garden Irises.

(" *The Garden*"—*March 7th,* 1925.)

In recent years irises have become much more popular as garden plants than they were twenty or even ten years ago and many beautiful new varieties have been raised by hybridisation and are now available in this country. There are many good irises, one or other of which will be in flower at intervals throughout the year and which deserve to be far better known than they appear to be at present.

Take for instance, the Algerian I. unguicularis or stylosa, which, when established at the foot of a south wall in soil containing a good proportion of mortar rubble, will begin to flower in October or November and continue into February and March. In how many gardens is this beautiful flower still unknown !

No one expects to have Christmas roses at their best in December and January without covering the plants with glass, and yet the irises which flower in the first days of the new year are neglected because the blooms need the same protection if they are to last their full time of a week or ten days. Few sights are, however, more charming in January than a cold frame filled with the brilliant blue flowers of I. histrioides or with the gorgeous colours of I. Rosenbachiana. Of the latter I have raised several hundreds from seeds, of which I obtained my first supply from Sir Michael Foster as long ago as 1906.

There is infinite variety in the colour of the flowers, which rise to a height of four inches or six inches above the sheath which still encloses the young leaves. A little later come I. persica and its relatives, I. Tauri, with its flowers of dark red-purple and gold, and I. stenophylla, with its two shades of blue-purple. Even more attractive is the hybrid persind, with beautiful, pale turquoise-blue flowers.

It is difficult to understand why the more vigorous of the Juno Irises, such as I. bucharica, are not more widely known, and yet there are few more beautiful bulbous plants that flower in April than this species and some of its hybrids. They are perfectly hardy and grow well in any light, rich soil that is not slug-infested. The plant grows to a height of about twenty inches or two feet and each stem bears as many as six or seven white and yellow flowers in the axils of its broad shining leaves. These irises are no trouble whatever to grow for they may be left undisturbed for about three years, until in fact the bulbs become so crowded that it is well to lift and separate them. The fleshy roots, which remain attached to the bulbs during the resting season, are very brittle when they are first lifted, but become tougher after a few days, and it is better therefore to wait a week before attempting to separate them. They should be lifted, when necessary, in July, and nothing is gained by keeping them out of the ground after September.

The best position is a sunny border sheltered from the north and it must be remembered that the bulbs will not tolerate disturbance except when they are at rest during the summer months. Lifting in October or November together with the occupants of an ordinary herbaceous border will probably be fatal.

Not every gardener seems to realise the fact that the best way to ascertain when to move a plant is to examine its roots, and not every gardener seems to be aware that bulbs differ very much in their methods of root formation. Some, such as tulips and crocuses, produce annually only one crop of roots, and, if the bulbs are disturbed after the roots have grown in the autumn, they will certainly be severely checked and take a year or two to recover their strength. Fritillarias behave in the same way, but their roots are so fragile that the check is even more severe, and so it is with bulbous irises.

In these labour-saving days, when more and more of our gardens are being planted with flowering shrubs, there seems no reason why we should not plant between them some of the Californian species of irises, several of which are practically evergreen and all of which have a comparatively long-flowering period. Seeds should be sown in pots in the open in the autumn. As soon as germination takes place, the pots should have the protection of a frame or cold house and the young plants should be encouraged to make rapid growth. They will then be big enough to be planted out in their permanent positions before the end of May and, given a favourable year, some will flower in the following season. The best species for this purpose is I. Douglasiana, of which every seedling seems to be different in colour and markings, while I. tenax is even more floriferous, though its foliage is deciduous. These Californian species like a light, rich soil and will grow satisfactorily in chalk.

Two larger species, I. longipetala and I. montana, are vigorous enough to hold their own in a mixed border and are more at home in a heavy soil than those previously mentioned. Moreover, they will tolerate some lime in the soil.

Another good border species is I. graminea, though it is a plant which many would pass without comment. The flowers of red-purple and blue-purple are richly coloured enough, but often hide themselves among the close-growing foliage. Their special merit is that they have the sweet fragrance of a warm, ripe plum. I. graminea is easily raised from seed ; it will grow in any good border soil and may remain untouched for several years. If the clumps have to be moved, the best time is the late summer, when fresh roots are still pushing out from the slender hard rhizomes.

Taller relatives of I. graminea, namely, I. ochroleuca, I. Monnieri and I. aurea, are all good border plants, valuable for their tall stems, rising to a height of four feet or more, and for their stiff, upright foliage. The first has flowers of white and yellow, the second is a pale lemon-yellow, while the third is of a deep golden yellow.

They all do well in rather stiff soil and flower best if they have abundant moisture during the growing season in spring and early summer and a thorough ripening when their growth is over for the season.

Some forms of I. ochroleuca are the tallest of all irises and among the smallest are I. cristata and I. lacustris, two American irises, of which the former is four inches or six inches high and the latter only two inches or three inches. These should be grown in a moist, half-shady position in a soil composed of well-rotted leaves and fine gravel. Never plant these irises in the autumn, for failure is then almost certain, unless indeed they are obtained in pots. The best time to begin is in June, a week or two after the flowers have faded. Then it will be found that each flowering shoot has branching out from it three or four young tufts of leaves. These should be cut off and replanted immediately. They must then be kept moist for a few days and will quickly send out new roots and each one should flower in the following season. When I. cristata is treated in this way it will produce sheets of its pale lilac flowers in May, so closely set as almost to touch each other. A moist, half-shady position, such as that which suits primroses, is also the best for the daintiest of all irises, I. gracilipes, which flourishes in copses on the hillsides in Japan. Hot sun will soon shrivel the slender rhizomes, which are, however, easily cultivated in such a position as that described. The plants should be frequently top-dressed with well-rotted leaf-soil.

January Flowers.—Irises.

(" *The Gardeners' Chronicle*"—*February* 10*th*, 1923.)

Plants that flower in the open garden in January may be divided into two classes, the many which will occasionally produce a few stray flowers in open weather in that month, and those which regularly flower then. Little work seems to have been done on the question of the causes that bring plants to flower in one month rather than in another. We expect Iris unguicularis to give us flowers in November, but why should it not wait till April or May, when most of the others flower? It is true, doubtless, that in its native Algeria the autumn and winter rains rouse the plants into activity after their long sleep in the scorching heat of summer, and that they are then in a hurry to flower and to set and ripen their seeds before the drought sets in again. There is confirmation of this explanation in the fact that after a comparatively cold and sunless summer like that of 1922, this iris is much later in coming into flower in all but the most sheltered and driest positions. On the contrary, it is difficult to see why two irises so closely related as I. histrioides and I. reticulata should flower the one in January and the other in March, under identical condition of cultivation.

The former species comes from northern Asia Minor, and the latter apparently from the Caucasus, and we might have thought that the winter conditions in these two districts were so similar that allied species which had developed in them would have been identical in their behaviour when grown under similar conditions in our gardens. The fact, however, remains that there are these differences in the behaviour of closely-allied species, and there is no obvious explanation of them, unless it is to be found in slight variations in local conditions, which could only be detected by close observations on the spot.

Some of the early irises are among the most brilliant of all hardy flowers, and never fail to appear in January, unless, of course, there is a continuous spell of hard frost. Even when there are spells of frost it is astonishing with what rapidity the flowers appear as soon as the wind goes round to the west and the frost gives. The buds seem to be waiting in readiness in their parchment-like sheaths or spathes just below the surface, and it only remains for the tube that separates the actual flower from the ovary to lengthen. This lengthening of the tube may be very rapid—as much as an inch in less than twenty-four hours.

Of these early irises, I. histrioides is one of the most reliable. Even after the bad summer of 1922 and in the none too favourable surroundings of a suburb not ten miles from Westminster, the masses of buds that have appeared on clumps of this species are really amazing. The buds appear in their membranous spathes almost before the points of the leaves have pierced the surface, and then the broad-petalled, sturdy flowers unfold rapidly. The colour is a bright rich blue, except in the centre of the heart-shaped blade, where there is an area on which the white ground with its inconspicuous median yellow ridge is closely blotched with the same shade of blue.

Among seedlings of this iris there is a certain amount of variation in the exact shade of the blue colour, and a pure white form with a central yellow ridge has appeared among some seedlings this year. There are also differences in the exact shape and poise of the standards. The falls and the style-branches are, however, always extended in a plane that is much nearer to the horizontal than is the case in any of the allied species excepting I. sophenensis. This might almost be looked upon as a small and less brilliantly-coloured form of the same species, for it behaves identically in every way. It thrives under the same conditions, and has the same method of increase by forming at the base of the flowering bulb a number of very small bulblets, which take several years to develop into bulbs of flowering size.

Very similar to I. histrioides is I. histrio. It differs, however, in having more distinctly funnel-shaped flowers, in which the blue blotching on a white ground is even more conspicuous than in I. histrioides. Another point of difference is that the leaves of histrio are so far developed before the flowers appear that they overtop them. I. histrio is a very variable plant, and some forms of it are apparently much more delicate than others. A good form is a most desirable plant, and may be relied upon to furnish flowers in January.

Smaller than either of these irises but even more brilliantly coloured are some hybrids between the well-known I. reticulata and the rare species I. Bakeriana, which has passed on to them the velvety texture of the blades of its falls. If these hybrids prove to have the constitution of I. reticulata they will be a valuable addition to the list of irises which will flower in January.

In the hungry sand of Godalming it was never easy to keep these plants healthy, but in a piece of old kitchen garden where the rather light soil has been well enriched with humus from constant dressings of manure in the past, they are now doing extremely well.

Another bulbous iris which never fails to give flowers in January is I. Rosenbachiana, a Turkestan species that delights in a well-enriched, sandy soil and a thorough baking in summer. The earliest forms are white, with a deep crimson tip to the falls, along the centre of which runs a conspicuous golden crest. The flowers spring from the bare earth almost before the tips of the leaves are showing, and a strong bulb will throw two or even three flowers in succession.

All these irises may be enjoyed in the open ground, but an even better way is to pick the buds just before they open and then stick them in shallow bowls of wet sand, where they will remain in full beauty for more than a week, provided that the room is not overheated. The same method should be tried with the January crocuses, for it is seldom before February that we get enough sun, at any rate near London, to cause the flowers to open wide.

Hints on the Cultivation of Irises.

(" *The Garden*"—*July 5th*, 1924.)

The genus Iris contains so many species of totally different types that no general rules can be given for the cultivation of irises as a whole. Some gardeners seem to think that, because our native yellow I. pseudacorus grows by the river-side, all irises want abundant moisture, while others have no knowledge of the existence of any irises besides bearded irises and Spanish Irises. There are, however, many different sections and groups within the genus, the members of each of which need approximately the same treatment.

In cultivating unfamiliar plants it is usually helpful to consider the climate of the country from which they come, and this rule holds good with irises. The commonest irises in our garden are hybrids of certain bearded species belonging to the Pogoniris section and these species are all natives of regions which have what geographers call a continental climate and where the long period of drought during the summer months forces plants to undergo a resting period. This enforced rest seems to economise their energies and to prepare them for an outburst of rapid and continuous growth as soon as moisture comes, either in autumn or with the melting of the winter snow. Consequently, in attempting to cultivate these irises in our gardens we must plant them where they will enjoy all the available sun and in such positions that sharp drainage will keep the rhizomes comparatively dry.

In southern countries the ground is often so hot in summer that it is almost impossible to rest the bare hand for long on a rock and the iris rhizomes, which love to grow in sunny, rocky positions, get a ripening which they miss here. However, we must do our best for them by planting them practically on the surface, so near it, in fact, that by the time the earth has settled down, the upper half of each rhizome will be exposed. The other essential point about the cultivation of bearded irises is that they all come from districts with a limestone soil and they never remain healthy for long in a soil that is deficient in lime. The best addition to soil in which irises are to be grown is old mortar rubble, for this, besides supplying lime, seems to improve the texture both of heavy and light soils. If mortar rubble is unobtainable, it is best to use finely-ground chalk on light soil and slaked lime on heavy soil, applied, is possible, when beds are being dug in readiness for planting and in the autumn to established beds.

In the early spring of this year there were numerous complaints from iris growers, especially in the north and in the colder districts, that parts of their plants looked unhealthy and were collapsing. This unhealthy, pale, yellowish appearance is, I believe, not directly produced by disease, but by premature growth from imperfectly ripened rhizomes. This unhealthy condition of the rhizomes may lead to attacks of rhizome rot, which causes the tufts of leaves and the stems to fall over at flowering time.

The remedy is to cut out all diseased parts and to dress the remainder and the surrounding soil with superphosphate of lime, of which the acid reaction is fatal to the bacillus which causes the disease. If the healthy remnants of the plants can be moved into fresh soil, which has been freely sprinkled with superphosphate, so much the better.

There are two other diseases to which bearded irises are prone in this country ; one is leaf-spot and the other a reddish-brown rust, which I first obtained from Sir Michael Foster's garden at Shelford and from which I have never yet been entirely free, though I am inclined to believe that it could be stamped out if I had the time to spray all my plants at weekly intervals for a month or six weeks with a solution of copper carbonate. Only a few irises seem really liable to this rust.

The leaf-spot is much more common and more unsightly, for the spots or patches of brown on the leaves spread in size and increase in number until the foliage is more or less destroyed. This weakens the rhizomes and lessens the chance of flowers in the succeeding year. The remedy is, I believe, abundance of lime or chalk in the soil to keep the rhizomes healthy and frequent spraying with disinfectants, such as permanganate of potash or Bordeaux mixture, when there are signs of an attack.

The minor sections of bearded irises, such as the Regelias from Turkestan and the Oncocyclus from Syria, Asia Minor and Persia, are so dependent upon thorough ripening in summer that we have to dig up the rhizomes about the middle of July and keep them warm and dry until they are replanted in October. On the other hand, the Himalayan Pseudoregelias are difficult in this country because, although they enjoy the moisture of our average summer, yet they want dry autumns and winters. In their native homes they doubtless lie dormant under the snow until they are roused to life again by its melting in spring.

The beardless or Apogon species have, as a rule, much more slender rhizomes than those of the bearded irises and consequently are, as a whole, far less adapted to withstand drought, Some, such as the sibiricas, have compensation for the slenderness of their rhizomes in the extraordinary abundance of the actual roots, which supply the plants with the copious moisture needed to sustain the exuberant growth of the leaves and flower stems. Others, such as the Californian species, have slender rhizomes and yet, at the same time, remarkably few roots, an indication that their growth is slow and that they will flourish in a soil which is inclined to be cool and well supplied with nourishment. Some irises are obviously water plants and in these there are always present minute black specks, which can be clearly seen when a leaf is held up against the light.

They are found, for instance, in our native I. pseudacorus, in its American cousin, I. versicolor, and in I. laevigata, which is a totally distinct species from I. Kaempferi, from which the Japanese have evolved their innumerable garden hybrids. I. Kaempferi is, therefore, not strictly a water iris and the Japanese have found the truth of this and so arrange their iris gardens that the beds stand high and comparatively dry in winter, though they are surrounded by and soaked with water during the period of rapid growth in spring and summer.

All the bulbous species of iris, with one exception, enjoy a rest in summer, and therefore should be planted in rather light, well-drained soil. The single exception is I. xiphioides, sometimes called the English Iris, though it is a native of the Pyrenees. There, except in winter, when the ground is doubtless frozen, the bulbs get abundant supplies of moisture and flourish in the wet alpine pastures. This fact should be remembered when Spanish Irises do not do well. The best course is probably to plant I. xiphioides instead.

Much has been written on the best time to transplant irises.

Bulbous species should, obviously, be moved in summer, when the bulbs are dormant, and, with regard to the others, the best rule is to examine the roots and never move the plants unless new roots are being made. Plants shifted at other times merely lie in the ground without taking hold of it and suffer accordingly. Iris sibirica will, therefore, be moved either early in spring or as soon as the ground is really wet in September, and while the plants still have time to form new roots before winter. The Californians will only be moved during the spring and early summer, while Japanese Irises and the Spuria group may be moved either in spring or in August or early September, provided that the soil is moist till the plants have taken hold.

Bearded irises of the Pogoniris section may be moved when in flower, provided that the rhizomes do not remain long out of the ground, for otherwise the young roots will wither. If they have to go a journey, then August or early September is best, for the main roots will then be mature and many of them still unbranched, so that they are prepared to branch out and lay hold of their new homes. Avoid July, for it seems probable that it is during this month that the flower buds are formed for the following year. Disturbance at this time is apt to lead to loss of bloom in the following season.

Species and Varieties of Irises.

(“ *The Gardeners' Chronicle*”—*March* 25*th*, 1911.)

No botanical question is more difficult to answer than this : What is a species, and what is merely a variety ? The examination of any large collection of living plants or of herbarium specimens shows that when analysed in detail scarcely any two plants are absolutely identical, and the botanist's difficulty lies in discriminating between essential and non-essential differences and similarities. Moreover, for the botanist, as opposed to the gardener, the difficulty is rendered the more insuperable by the fact that its solution is probably not to be found in herbaria at all, but must be sought in the evidence of seedlings. In these days, when gardening is so popular, it is astonishing that few can be found to engage in the fascinating pursuit of raising supposed species from seed and noting the variations in the resulting plants. It is curious, too, that this is not a method of enquiry that seems to appeal to the professional botanist. At any rate, it is rare to find any that put it into practice, or any provision for it at large botanical institutions.

It may be that monocotyledons—and irises in particular—are more liable to vary than other plants, and the object of this note is to give instances from this genus, in the hope that it may elicit information from those who have closely studied other genera.

Let us take first an iris with which everyone is familiar, namely, I. pseudacorus, the yellow water iris that is common in England and all over Europe. Several varieties of this iris have received specific names, such as I. Bastardi and I. acoriformis ("*Bor. Fl. cent., France, ed. III., p.* 635, 1857), I. curtopetala ("*Redouté Lil.,*" *t.* 340, 1812), and I. acoroïdes ("*Spach, Hist. Vég.,*" *XIII., p.* 44, 1846). These species were based on variations of colour, the length and shape of the standards, and on the presence or absence of a darkly-veined patch on the blade of the falls. It is true, of course, that they have ceased to be looked upon as species, but they are still kept up in the latest work on the European flora as something more than mere garden varieties. In face of this, it was surprising to find several variations among self-grown seedlings of a plant of this iris, which came originally from the River Wey in this immediate neighbourhood. The parent plant bore flowers of a deep yellow, with a distinct patch of dark veining on the falls, but, among the seedlings, there was a paler yellow form, with no trace of these markings. Moreover, the precise shape and dimensions of the standards were different in nearly every case.

Take, again, another familiar species, I. reticulata. In the wild state, apparently, the deep blue-violet form, which is known to botanists as the type, is much rarer than red-purple forms, to which the name of I. Krelagei has been given. Moreover, among plants raised from self-fertilised seed of the so-called type, the type itself is probably the rarest form to be obtained. What is more remarkable still is that, though this evidence would seem to point to the fact that we have here two varieties of the same iris, the capsules of the two forms are quite distinct in shape. That of the blue form, the so-called type, is long and narrow, and that of Krelagei short and broad. When compared with the capsules of a number of other iris species, these two are seen at once to resemble each other, but, on the other hand, it would be easy to separate a mixed collection of capsules of these two forms into two distinct groups.

Another instance is supplied by the case of I. graminea and its broad-leaved form, on which the specific name of I. sylvatica was bestowed by Balbis (" *Roem. and Schult. Syst., I.*," 476). The form of I. graminea most commonly found in nature and consequently in herbaria, and also in gardens, has narrow, grassy leaves, scarcely more than a quarter of an inch to one-third of an inch broad, and not much more than fifteen to eighteen inches long. When, however, seedlings of this iris are raised and grown from the first in good soil, there is a remarkable change. In the majority of cases, the leaves are much longer and wider, and frequently attain to 3 feet in length, and over an inch in width, so that the plants are scarcely recognisable.

A slightly different question of classification was settled by the raising of I. Alberti from seed. This was originally classed among the Pseudevansia group, in which were placed those irises in which the beard appeared to rise from a more or less distinctly-raised ridge or crest. The seedlings showed that this supposed ridge is not characteristic of the species, and is, indeed, often entirely absent. Further evidence of the worthlessness of this character was supplied by the examination of numbers of seedlings of I. chamaeiris, the other dwarf irises, which commonly usurp the name of the true I. pumila—a plant which is, apparently, exceedingly rare in our gardens. Many of these seedlings showed signs of a crest beyond the end of the beard, but the amount varied even on the three falls of the same flower. The first specimen found by Regel, in Turkestan, probably had distinct traces of crest, but, in other respects, I. Alberti is nothing but an ordinary bearded iris, and should appear among the Pogoniris, in the company, perhaps, of I. obtusifolia and I. Talischii, which it resembles in some respects, especially in the case of a yellow-flowered form which has appeared among the seedlings.

The instances given above have tended rather to help than to perplex the puzzled enquirer. Other results, however, also obtained from seedlings, have only increased the difficulty of the subject. Perhaps the most astonishing result was the discovery that the white-flowered form of I. tectorum comes invariably true from seed, although no character except colour can be found to separate it from the blue-purple type. Moreover, the pollen of the white form has no effect on the blue when the two are crossed, at any rate, in the first generation, for nothing but blue-flowered forms have resulted from this cross. The Mendelian theory suggests the raising of a second generation, but, unfortunately, first crosses among irises are often sterile, unless the parents are closely allied. Thus olbiensis *x* Korolkowii and Cengialti Loppio *x* tectorum have both proved infertile, and the whole experiment points to the fact that the so-called white I. tectorum is, perhaps, something more than a mere colour variety.

Another puzzle lies in the various forms of I. setosa and I. Hookeri, the Asiatic and American forms of what appears to be the same iris. In these, the standards are reduced to minute bristles, or, at any rate, to very small dimensions. The exact form of the standards does not appear to be constant, nor do either of the two more usual formations appear to be correlated to any other character. At least four or five distinct forms of this puzzling species come sufficiently true from seed for groups of them to be at once distinguishable, though the exact differences are very difficult to define.

The same difficulty occurs in the case of the various forms of I. ensata, of which name the synonyms are legion. The leaves of a batch of a dozen or twenty plants of one form all grow with a curious twist, which is noticeably absent from those of a neighbouring group. Yet dried, herbarium specimens would appear essentially alike.

Another unsolved problem is that of the group of American irises to which the names of I. longipetala (Herbert), I. missouriensis(Nuttall), and I. tolmeiana (Herbert), have been given. An examination of the type specimens of these three species seems to suggest that the two latter are identical, and that they represent the Alpine or dry upland form, while I. longipetala is the more luxuriant Pacific Coast variety. The latter has broader, longer leaves, and a sturdier and fuller inflorescence. Moreover, the new leaves come up in the autumn and attain some height during the winter. All these characters are reproduced in seedlings, as is also the case with the more slender form to which the other two names were given. Here the leaves do not shoot until the spring, and never attain the height or luxuriance of those of I. longipetala. The flowers, however, and the essential organs of the two forms are identical, except, perhaps, in size. (No account is here taken of what is, perhaps, an unnamed species, often found in gardens under the name of I. missouriensis or I. tolmeiana. This has in the spathe only two flowers, in which the ovaries are nearly sessile, while the pedicels of both the forms of I. longipetala are produced to some length, and the number of flowers in the spathe nearly always exceeds two.)

On the whole, these instances tend to show that plants are very like human beings, among whom family likenesses are transmitted from generation to generation. Yet no one will deny that family likeness is much more marked in some families than in others, though no reason has ever yet been given for this phenomenon. Individual differences are always found, even when the family resemblance is most strong, and this consideration would seem to point to the extension rather than to the narrowing of the limits of each species.

Irises of the Future.

(*" The Gardeners' Chronicle "—May 28th*, 1921.)

It is never easy to prophesy correctly, even if successful prophecy is little more than intelligent anticipation. The following notes, therefore, are intended less as an indication of the future than as possible suggestions.

Among the early bulbous irises there seems little hope of new developments unless we can hold in check the fungus disease which plays such havoc among the bulbs. If we could overcome and eradicate this, there would be no end to the delightful series of beautiful hybrids which might be raised by crossing the richly coloured, velvety-petalled I. Bakeriana with the other species. The yellow I. Danfordiae might also be used to give us entirely new forms.

The Juno species seem to suffer from an undeserved neglect, for there are few finer garden sights in April than a large mass of the glistening, sturdy foliage of I. bucharica, closely set with the large white and yellow flowers, while the endless variety of colouring to be found among seedlings of the gorgeous I. Rosenbachiana well repays the patience which is needed during the three or four years that the bulbs require to grow from seed to flowering size.

The later bulbous irises, comprising I. xiphium (the Spanish Iris) and the kindred species, seem to have fallen under a cloud, from which they will hardly emerge until some remedy is found for eelworm in the soil, for this pest appears to be as fatal to Spanish Irises as it is to the narcissus. If this can be overcome, the multiplication of the florists' varieties, both of the Spanish and of the Dutch Iris, will go on, but we cannot expect much from their combination with any of the allied wild species, though these are distinct enough in themselves. They do not seem to combine well either with one another or with I. xiphium. Thus I. filifolia, when hybridised, loses its magnificent red-purple colour, I. Boissieri has the long hairs of its beard shorn down to half their length, while the clear golden-yellow of I. juncea becomes dull and streaky.

Of Oncocyclus and Regelia Irises I am distinctly more hopeful than there seemed any justification for being a few years ago. Experience goes to show that these must all be dug up annually about the middle of July. The rhizomes may then be left lying out on the ground for a few days, provided that the sun is not too incessantly brilliant and scorching. They should then be trimmed of their leaves and stored away, preferably in perfectly dry sand, in a well-ventilated, dry place, until the first week in October. The rhizomes and the roots should, with this treatment, remain firm and be ready to start into root growth as soon as they are replanted in rich, well-drained soil. At one time it used to be thought that the soil must first be beaten and trodden down until it was almost as hard as a rock, but this seems unnecessary, in view of the way in which these irises flourish in the loose sand of Haarlem and in the drier, but equally light, Surrey sands.

To my mind, the fault of the Regelio-cyclus hybrids that are already in commerce is that they are nearly all of them mere colour variations of the same type of flower. When we remember, however, how utterly different I. paradoxa is from I. susiana and from I. iberica, and how each of these latter differ from the aptly-named I. acutiloba and from the rounded, self-coloured flowers of the purple I. Mariae and its yellow counterpart, I. urmiensis, I cannot help feeling that crosses with these species might give us new types. Evidence to confirm this exists in the pleasing results that have resulted from crossing I. acutiloba and I. lupina (*syn.* Sari) with I. Korolkowi. The former gives very floriferous hybrids with the extended falls of acutiloba and the prominent veining of Korolkowi, while the latter retains the shape of I. Sari and something of the colouring that won for that species the name of the Wolf Iris, I. lupina.

No hybrids have yet appeared of I. Hoogiana, the last-discovered and most astonishing member of the Regelia section. Its unveined, self-coloured flowers of pale or dark blue-purple are so beautiful that it seems almost sacrilege to attempt to hybridise into them the veinings and dottings of the other Regelia and Oncocyclus species, with which there would probably be no difficulty in making crosses.

Nothing has, so far, been said about the great class of

Pogoniris or bearded irises, which to so many comprises practically all the irises that they know. Here the tendency is to aim at increased stature and a more widely-branching habit in the inflorescence, qualities which are obtained by using as parents I. trojana and other giant species, such as I. mesopotamica and I. cypriana, which have now become more widely distributed. Whether we should aim at self-colours or at variegation in the flowers is a matter of personal taste and it is devoutly to be hoped that no self-constituted body of florists will attempt to lay down strict canons on this or on similar points and then try to ensure that all our irises should conform to these canons.

For garden ornament it is hard to find anything more decorative than self-coloured pallidas, which can be obtained in a long series of shades from a deep blue-purple to a pale pink. If pallidas, are, as a whole, later than the so-called I. germanica, it is easy to obtain an early race by crossing I. pallida with I. Alberti, from Turkestan. The characteristic veining on the falls, which ends so abruptly and which is typical of the species, is not sufficiently prominent, except at close quarters, to spoil the effect of self-coloured flowers. At the other end of the season something might be done towards prolonging it by using the late-flowering Black Prince. Seedlings of this tend to retain the late-flowering habit, and, as there is a large dose of I. variegata blood in Black Prince, forms with yellow standards are sure to appear among them. It remains for the hybridiser to get rid of the stunted stem, the crowded inflorescence, and the ugly form of the flowers, with their erect, widely-separated standards.

Among the Evansias something good might come from the crossing of I. Wattii, which does so well when planted out in a cool house. It ought to cross with I. japonica and possibly also with I. tectorum and I. Milesii, if these two could be forced into flower early enough. I. tectorum and I. Milesii seem themselves to be so closely related that it is surprising that all attempts to cross-fertilise them have hitherto ended in failure, though a combination of the large flowers of I. tectorum with the tall stem and sturdy foliage of I. Milesii ought to make a most effective garden plant.

Among the Apogons or beardless species there is still scope for much work in hybridisation. The members of the various groups of obviously closely-related species hybridise fairly readily with one another, and it is also possible to cross members of different groups with one another. For instance, the Californian I. tenax will cross with the Chinese I. Wilsoni, and the hybrid bears curiously speckled, dull purplish flowers with a yellow ground. I. Douglasiana crossed with the Himalayan I. Clarkei gives a mottled, pinkish flower of no great merit, but, when crossed with the Chinese I. chrysographes, gives a beautiful flower of a crushed strawberry colour, with gold veining on the falls

Those who will take the trouble to raise seedlings should turn their attention to the group of Californian species, of which it seems true in many cases that no two individual plants produce flowers of the same shade of colour. The variety to be found among seedlings of I. Douglasiana, I. tenax, and I. macrosiphon is endless, and, as the plants flower in two years from seed, no one need hesitate to embark upon their cultivation. The seeds should be sown in pots or pans, and the young plants are best grown on quickly under glass so that they are large enough to be planted out in the open in their permanent positions in May, if possible, or, at any rate, before mid-summer. They should then grow rapidly and develop before the autumn into plants of sufficient strength to pass safely through the winter.

The sibirica group has lately been extended by the new introductions from China, and all its members seem to hybridise readily with one another. Much may be done with the older and well-known species, I. sibirica and I. orientalis, for the large flowers and brilliant colouring of the latter can be readily combined with the tall stature and floriferous habit of the former, while the crossing of the white with the blue forms of either species will give seedlings a nearer approach to a true sky-blue than is found in any other iris.

The yellow Chinese I. Wilsoni will give a yellow ground to I. sibirica and to I. Delavayi, and the combination is particularly pleasing in the latter case.

Two of our native species, I. pseudacorus and I. foetidissima, do not seem to lend themselves at all readily to hybridisation with others. I. pseudacorus seems to reproduce itself with whatever pollen the flowers are fertilised, and nothing seems able to fertilise I. foetidissima except its own pollen. It is true that there exists a plant which appears to be a hybrid between I. pseudacorus and its closest ally, namely, the American I. versicolor, but no record exists of the origin of the hybrid. Its sterility is some indication of its hybrid origin and its intermediate position between the two abovenamed species suggests that they were its parents.

Hybridisation is a fascinating pursuit, and enough has already perhaps been said to show that much remains still to be done among irises, especially when we remember that crosses that have often been tried in vain may at length prove successful.

The Classification of Garden Irises.

(" *The Journal of the Royal Horticultural Society* "—*January*, 1922.)

This classification deals only with bearded irises grown in gardens, and is based on comparative trials of the various varieties which were begun at Wisley in 1915. At first it was hoped that it would be found possible to adopt a classification based on the wild species from which the various hybrids have sprung, but it soon became apparent that for garden purposes the colour of the flower and the height of the plant are of more importance than the botanical affinities of the latter, however interesting they may be in themselves.

The plants are therefore arranged in their colour groups and against each plant in the list will be found the average height of the stem in inches and the approximate time of flowering. In this connection it must always be remembered that the same plants grow very differently in different soils and environments, and that variations of temperature and moisture in different seasons have also considerable influence on their growth. The measurements and dates given must therefore be understood to be relative rather than absolute, but it is hoped that the figures will show accurately whether one variety is taller or dwarfer than another, or flowers earlier or later.

The adoption of colour as the basis of arrangement led at once to the vexed question of the names of colours. The segments of the flowers of an iris are seldom uniform in colour when closely examined, and it is therefore hopeless to attempt to describe the colours by reference to any known colour chart. The colours given in the classification must be taken to represent the general effect of the various varieties as seen growing in the border at a distance of a few feet. A further difficulty lay in the fact that there is no general consensus of opinion as to the exact meaning of such colour names as violet, lavender, mauve or lilac, all of which are frequently used in describing iris flowers. It seemed best, therefore, to adopt the less definite names, " red-purple " and " blue-purple," which could be hardly misleading, and merely to make sub-divisions into "light" and "dark."

It may be a disappointment to some gardeners to find that such botanical names as germanica, neglecta, plicata, squalens, etc., which have long been familiar in nurserymen's catalogues at the head of various groups of irises, have now been abandoned. Increasing knowledge of irises, as they are found growing in the wild state, has, however, shown that these names were originally applied to forms of the various hybrids and to sports to which the wild species do undoubtedly give rise, and that they did not represent what are usually accepted as species. It seemed, therefore, that no useful purpose would be served by retaining these names.

It may, however, be not without interest to indicate some of the species from which our garden irises have arisen and to point out some of the characteristics which they have derived from them. In order to do this it is, however, necessary to look somewhat closely into the structure of an iris flower, and so to gain some appreciation of the value of the various parts of the inflorescence for purposes of classification, always remembering that for this purpose colour alone is entirely unreliable and should be neglected.

When the bud first appears it is seen to be enclosed in two more or less boat-shaped valves or spathes, which may remain wholly green (herbaceous) even when the flowers have expanded, or become entirely papery (scarious), long before the flowers open, or vary to any degree between these two extremes. Inside the spathes, the ovary or immature seed vessel is supported on a stalk or pedicel, which may vary considerably in length. Above the ovary, there is a perianth tube, which at its upper end gives rise to the six segments forming the main part of the flower. Of these the inner three stand erect and are called the standards, while the other three droop and are called falls. The perianth tube surrounds the base of the style, which connects the ovary with the three style-branches. On the under side of each style-branch there is a projecting lip or stigma to which the pollen has to be conveyed in order to fertilise the flower. The style-branches also arch over and protect the anthers, which will be found lying close beneath them. The position of the anthers in the bearded irises is such that self-pollination is practically impossible. It can only be effected naturally by the agency of the bee, which, in its search for nectar at the base of the stamen, brushes the pollen off the anther on to its hairy back, from which it is scraped by the stigma of the next style-tunnel that the insect enters, either on the same flower or on another. To pollinate an iris artificially it is necessary to extract the anther from a flower by means of forceps, and then draw it across the stigmatic lip in such a way that the pollen grains are deposited on it.

Among bearded irises there are few exceptions to the rule that the varieties increase in height as the season advances. Among the earliest to flower are the various forms of I. pumila and I. chamaeiris, and of their Balkan counterparts, I. mellita and I. Reichenbachii. I. pumila is stemless, but has a long perianth tube, while I. chamaeiris always shows a stem of some inches in length, but has a comparatively short tube. Precisely the same difference exists between the two Balkan species, which however, both differ from the western pair in the possession of a sharp ridge or keel running along the back of the spathe valves. I. pumila is comparatively rare in cultivation, and even the well-known pumila coerulea is almost certainly a hybrid of garden origin. Forms of I. chamaeiris are much more common and include nearly all the plants offered in catalogues as pumila. I. mellita is known in its form rubro-marginata from Mount Rhodope, while to I. Reichenbachii belong such forms as balkana and the dwarf yellow and purple irises sent home from Salonika.

Of the origin of I. germanica, all that we know for certain is that it is not a native of Germany. Indeed, it is in all probability a hybrid, derived from I. aphylla, which, in various forms is widely distributed over Central Europe. If I. germanica were a German species, it would lose its leaves in winter, as do all Central European irises, and would be just as likely to seed freely in this country as I. aphylla, I. pumila, I. pallida and I. variegata. However, I. germanica retains its leaves in winter, and often remains flowerless owing to the destruction of the buds by frost, and hardly ever produces more than one or two sound seeds in a capsule. Indeed, it usually refuses to set any seed at all, and the few that are obtained give rise to plants of entirely different habit. Many of them closely resemble I. aphylla, of which it is characteristic that the stem branches below the middle and often even at the ground line. It seems, therefore, that one parent of I. germanica was probably some form of I. aphylla, but it is not easy to suggest the other. Another point of interest is that when the first flowers of I. aphylla expand, the spathes are always wholly herbaceous, either green or more or less flushed with purple, whereas in I. germanica the spathes are herbaceous in the lower half and scarious in the upper.

The origin therefore, of the various forms of I. germanica must for the present remain obscure, but there is less doubt about that of the later-flowered varieties of garden irises. The older among them seem all to have come from two species—I. pallida and I. variegata. Of these, the former has entirely scarious spathes, a comparatively tall stem with very short lateral branches, and either glaucous or green leaves, while the latter has entirely herbaceous spathes, a much-branched stem, and strongly ribbed green leaves, which may or may not be flushed with purple at the base.

These two species are natives of southern Central Europe, and may be found growing in close proximity in the neighbourhood of Bozen and also in the Simokos region of the Velebit mountains on the Dalmatian coast. In this region the plants grow at an altitude of some four thousand feet above the Adriatic, and are consequently dwarfed, but they comprise both pallidas and variegatas, and also miniature forms of what were once known as sambucina and squalens. The purple of I. pallida combines with the yellow of I. variegata to give murky, shot effects in the flowers of the hybrids, and there is no evidence that any other yellow-flowered species has any share in the composition of garden irises. I. flavescens is not a wild species but a garden hybrid of variegata, though it was long confused with a very distinct plant from the Caucasus, I. imbricata, which is easily distinguished by its huge, inflated green spathes.

I. pallida is an extremely variable species. In Southern Tyrol we get large forms with glaucous foliage, somewhat resembling pallida dalmatica. This latter is probably of garden origin, for no plant at all like it is known to occur in Dalmatia, where the prevailing forms are more slender and have narrower and often almost green foliage.

I. variegata has been known, even in the wild state to give rise to sports such as the Hungarian leucographa, in which the yellow ground is replaced by white, and when such forms are crossed with the purples of I. pallida, it is easy to see how our garden forms have arisen. If confirmation of this theory is wanting, it is to be found in the fact that seeds of the well-known " Black Prince " self-fertilised gave rise to " Richard II." with its pure white standards, and to other forms with the yellow standards of I. variegata. The so-called plicata, with white flowers edged with purple, is obviously some form of I. pallida, but seems to contain some inhibiting factor which prevents the purple from extending all over the segments.

So much for the older forms. In recent years I. trojana has been introduced with its pointed buds and much-branched stem, and has proved a good seed parent. From it came such varieties as "Isoline" and it combines readily with I. variegata to give hybrids with the characteristic colourings of sambucina and squalens.

The other species that have more recently contributed to our garden irises are less easy to define, for several plants have been used from the shores of the Eastern Mediterranean whose botanical affinities are difficult to determine.

One plant of unknown parentage is the well-known Amas or macrantha, which Sir Michael Foster received from Amasia in northern Asia Minor. This is probably not a wild species, for it does not set seed with any freedom, but it has undoubtedly been one of the parents of some fine varieties, *e.g.*, "Oriflamme." Again, it is no longer easy to define the plant which Sir Michael Foster knew as I. cypriana, and we have probably lost from cultivation I. mesopotamica, which came originally from Mardin, and which was probably identical with the I. Ricardi which forms the basis of many of Monsieur Denis' fine hybrids.

It is to the size and vigour of these Eastern species, in combination with the colours derived from I. pallida and I. variegata, and with the deeply-branched stem of I. trojana that we owe the best of the more recently introduced varieties.

Pollen Grains as a means of Classification.

(*"The Gardeners' Chronicle"—December 18th,* 1909.)

Hitherto, as far as I have been able to discover, very little attention has been paid to pollen grains as a means of classification or as a help to the determination of the relationship between the various specimens of a genus. The reason probably is that systematic botanists are usually content to know dried herbarium specimens without having recourse to living plants ; the herbarium specimens seldom offer facilities for the examination of the pollen.

During the past year I have examined microscopically the pollen grains of about two-thirds of the known species of iris, which number in all about two hundred and seventy. Among them I have observed at least four distinct types, which agree to a large extent, but not in all respects, with the usual grouping of the species. So far, I have not obtained much help from this examination towards the arrangement of the species within each group, but a few curious facts have come to light.

In only one case—in that of the well-defined group of the Juno Irises—are the grains spherical. In all other species, as far as I have been able to examine them, the outline is a more or less pointed oval. In the case of these spherical grains the surface is covered with a number of hexagonal bosses, which, in their turn, are covered with a net-work of irregular markings and separated from each other by comparatively deep, smooth channels. The number of bosses on each grain seems to decrease with the size and vigour of the plant. Thus persica and caucasica have each about twenty bosses to the grain, while bucharica and warleyensis have only from seven to ten or twelve.

There is, however, one remarkable fact about the Juno group, and that is that there are two species whose pollen can be at once recognised as unlike that of all the others. In these two cases the grains are still spherical in outline, but closely set all over with small spines. I think that on some grains I have been able to trace very faint and shallow hexagonal markings, but on this point I do not feel very certain, for I usually fail entirely to see any sign of them. The species in question are the two Mediterranean representatives of the group that flower long before any of their Asiatic relatives, namely, alata and palestina. As to what may be the cause of, or the use for, the spines on the surface of the grains, I can make no suggestion, and it would indeed be interesting to find any explanation of the phenomenon or to hear from workers on other genera whether they have observed similar anomalies.

Abnormal Times of Flowering.

(*" The Gardeners' Chronicle "—August 3rd,* 1912.)

The late frosts in April this year destroyed numerous immature iris buds long before they had emerged from the leaves, as could be proved by dissection. The fine weather in May then assisted the growth of plants which were not obliged to throw their energies into flowering, with the result that many have flowered at abnormal times.

In the last week in July there are in flower here I. setosa

(Hookeri), I. tectorum, I. rubro-marginata, I. Reichenbachii, I. lacustris and even one plant of I. sibirica.

The only irises that can be regularly relied upon to produce flowers in August are I. dichotoma, a Chinese species, which is more interesting than beautiful, and hybrids of I. Kaempferi, when grown in a position that is shaded from the mid-day sun but not overhung by trees. I. dichotoma is now in bud here and will be in flower in a few days.

Unusual Forms of Iris Flowers.

(" *The Gardeners' Chronicle*"—*September* 10*th*, 1921.)

My experience has been that, among the hybrid bearded irises, flowers with two, four, or five parts instead of the normal three are extremely common. The well-known Queen of May is a constant offender in producing four-sided flowers, and among seedling Pallidas it is not at all unusual to obtain a plant which is apt to produce flowers in which all the petals drop and appear to be falls. The worst instance that I have known of this multiplication or deformity of the parts was a flower of the plant usually known as Iris sisyrinchium which had no fewer than ten falls.

Cold Storage for Oncocyclus Species.

(" *The Gardeners' Chronicle*"—*June* 19*th*, 1909.)

Owing to the folly of a gardener, who during last August copiously watered my cold-stored Oncocyclus plants because he thought " they looked rather dry," I was not able to lift and store the rhizomes for a second winter. However, I stored another batch of newly-imported rhizomes until the middle of February. Then for a week or two they lay in a frame in boxes of cocoanut fibre and sand—an excellent medium for encouraging root growth in dry or shrivelled plants. They soon began to send out roots, and I planted them early in March in a sheltered spot in sandy soil well enriched with old cow manure and leaf-mould. Throughout April and May they were kept well watered, and I have had five flowers of I. lupina (*syn*. Sari) and I. Elisabethae. Four flowers of I. Bismarckiana are in bud. The plants, too, are making vigorous growth, and will, I hope, provide good rhizomes for storing again in August.

Oncocyclus Irises and Cold Storage.

(" *The Gardeners' Chronicle*"—*August 8th*, 1908.)

In continuation of my note in your issue of June 19th, may I add that the rhizomes with which I experimented were newly-imported roots of such kinds as Lortetii, lupina, atropurpurea and Bismarckiana. I only packed up a rhizome or two of each, and hardly expected any flowers. However, the first to flower was lupina (*syn*. Sari) which bloomed on May 31st, followed by two more flowers of this species, and one each of atropurpurea and nigricans. The flowers were certainly somewhat small and the foliage slender, and I therefore intend another year to plant the rhizomes about a fortnight or so earlier, that is, about the middle of February, unless the weather is too unfavourable.

At present (July 14th) the plants are growing vigorously, and I shall endeavour to ripen them off with the aid of glass as soon as they show signs of going to rest. I shall then hope to be able to lift good healthy roots, somewhat more acclimatised to their present surroundings than when they arrived from the East last August.

[*In the late autumn of* 1916 " The Gardeners' Chronicle " *published correspondence from various enthusiasts on the subject of* " *The Planting of Flag Irises.*" *It is for various reasons impossible to reprint this correspondence here, but Mr. Dykes' contributions are reproduced exactly as they appeared. Readers who wish to see the* " *other side of the picture* " *are referred to the issues of* " The Gardeners' Chronicle " *about that time.*G.D.]

. . . . . .

The Planting of Flag Irises.

(" *The Gardeners' Chronicle*"—*December 9th*, 1916.)

Mr. Jenkins' article on this subject (*see p*. 264) has appeared at a time when it was already in my mind to write a note suggesting certain modifications in the rule that I have hitherto observed, namely, to endeavour to transplant my irises as soon as possible after the flowering season. I was going, however, to advocate a later, and not an earlier, period of the year and Mr. Jenkins' article has not converted me to his view.

Statistics are often deceptive, and the figures which, on the surface, seem to support Mr. Jenkins' contention, suggest on closer examination that they may equally well be used as an argument against his view. In the first place, the first flowering season after planting, namely, May, 1913, is altogether omitted, presumably because plants shifted in March could hardly be expected to flower in the following May. Secondly, Argus transplanted in March produced sixteen spikes in 1914 and fifty-eight in 1915, increasing to rather less than four times the number, while those transplanted in June increased no less than eight times in the same period, namely, from four to thirty-two. For Gracchus the figures also show that from 1914 to 1915 the June-planted specimens increased faster than those transplanted in March. The figure quoted for Queen of May do not, it is true, support my view, but I am confident that most iris growers will agree with me that if six plants of this variety were planted in 1913 and gave only three flower-spikes in 1914 and only four in 1915, there must have been something seriously wrong either with the plants selected, with the planter, with the planting, or with the position chosen.

Not having any weather statistics at hand, I am unable to suggest any definite reason why the plants moved in June, 1913, flowered so poorly in 1914, but I should not be surprised to find that a period unusually dry, or in some other way exceptional, was the cause of their failure.

If it has been Mr. Jenkins' invariable practice for thirty years never to transplant irises except in early spring, he has doubtless forgotten that new main roots are pushing out from the rhizomes certainly as late as August and often even in September. We must remember that an iris rhizome is not a stationary bulb, but a creeping stem which grows by travelling horizontally, and travels only by putting out fresh roots all through the growing season. Even among bulbs and corms there are two distinct classes, those which, like the tulip and the crocus, send out all their annual output of roots at one period of the year, and those which, like most narcissi and the gladiolus, are practically always sending out fresh roots unless they are lifted and dried off.

Mr. Jenkins, it seems, wishes us to believe that the iris behaves like the tulip or the crocus, whereas the fact is that it resembles rather the narcissus or the gladiolus in producing a few roots at intervals over a long period.

This period begins in spring, and continues throughout the summer into the autumn, and doubtless if we always had genial growing weather in March and April, and if we were content to lose the first flowering season entirely, irises transplanted in March would be better prepared for the flowering season some fourteen months later than those moved later in the season. Unfortunately in March and April we often get long spells of east winds, beneath the influence of which freshly-moved plants suffer visibly, and, moreover, we are not always willing to sacrifice the first flowering season.

There is a further point. No rhizomatous iris continues to grow in the same straight line beyond the flowering point. The flower-stem is the end of the axis, and growth is only continued by lateral branches. My impression is (but I admit that I should still like to make some observations on this point next spring) that when growth ceases in autumn a rhizome which is going to flower in the following spring has reached the point at which it will flower, and has formed all the roots that it will ever form on that axis, and that the new root-activity in spring is devoted to the extension of the lateral growths which are to carry on the life of the plant after the death of the flower-stem.

Obviously then, if we move our plants in March we sacrifice the first flowering season. I think Mr. Jenkins must admit this. The question then arises—If we prefer not to make this sacrifice, shall we transplant immediately the flowers fade or shall we wait till July or August? This year I had occasion in August to lift a number of irises, and I found that each rhizome then possessed a number of stout roots, which were still unbranched, and that it also showed obviously that yet other roots were still to emerge. At the flowering season the new roots are immature and exceedingly brittle, so that there is considerable danger of injury unless the plants have only to be moved a short distance and need not remain out of the ground for any length of time. Under these conditions it has certainly been my experience that irises moved in June suffer in no way, especially if in dry weather some water be poured into the bottom of the hole before the roots are put in.

If the plants have a journey to face I am inclined to think that there is less danger of damage when the majority of the primary roots are mature and as yet unbranched early in August, and that this is, then, the best period at which to transplant them, always provided that they get a liberal allowance of water at the roots if the soil is at all dry. Both in June and in August there is always a danger that even with great care the tender points of roots which have hardly emerged from the rhizome will be damaged, but whereas, in June, those roots which have pushed out are only partially developed and therefore easily broken or withered by exposure, in August a fair number are mature and therefore able to withstand handling and packing with less risk of injury. Moreover, the soil is warm and there is still time for the secondary lateral fibres to develop and for a few more main roots to push into the ground before growth ceases for the year.

The Planting of Irises.

("*The Gardeners' Chronicle*"—*December 30th*, 1916.)

(*See pp.* 264, 282 *and* 296.)

The chief difference between Mr. Jenkins' views on transplanting irises and my own seems to be this: If at the present moment he had a bed of irises which for some reason he was obliged to transplant, he would proceed to move the plants in March, well knowing that he thereby sacrificed next year's flowers. If, on the other hand, the operation were left to me, I should allow the plants to flower and then immediately transplant them, provided that the plants could be carefully handled and immediately replanted. If I were sending them to another garden I should be inclined to wait a little longer, though I am not sure that much would be gained by doing so. My experience here has certainly led me to be well satisfied with the results of transplanting as soon as possible after the flowers have faded. I am usually too busy to count flower-spikes but two years ago I did count on a square yard of soil eighty-two spikes of the commonest form of I. germanica, which I had moved after flowering the previous year. Doubtless if an iris rhizome is not going to flower, nothing is gained by waiting till June to move it, because a few root-fibres are certain to be broken, however carefully the plants are handled, but I am not yet convinced that the preservation of the few extra root-fibres that are produced by the lateral growths before the flowering season is worth the sacrifice of the flowers on the central growth. As to Mr. Jenkins' statistics my only object in showing that they could be read as favouring either view was to point out that they really prove nothing. It is as surprising to see that in subsequent years the rate of increase was so much greater among the June-planted rhizomes as it is to find that these same rhizomes flowered so poorly in the first year after transplantation. I can only conclude that in some way or other the conditions of this single trial were abnormal. If when March and June come I can spare the time and find the space in my sorely-congested garden, I will certainly try experiments in transplanting at different times, and give Mr. Jenkins and other readers the fullest information as to the results.

An Iris Disease.

(*" The Gardeners' Chronicle "—May 8th,* 1909.)

Of late years iris growers have from time to time suffered from the ravages of a disease which attacks the rhizomes of Pogoniris, generally at the flowering time. The leaves turn yellow, first at the tip and then all over, and flower-stems topple over and are found to be rotten at the base. The disease is said to be due to a fungus which attacks the skin of the rhizome, after which a bacillus enters in by the wound and completes the destruction. Lime has sometimes been suggested as a remedy, but though this may discourage the fungus it tends, I believe, to encourage the bacillus.

The only remedy, and this a partial remedy, is to take up affected plants at once, when it will be found usually that it is the old central rhizomes that are affected, whilst the young side growths are intact. These may be cut off, and possibly washed in some such disinfectant as permanganate of potash, and replanted in fresh ground. Since Pogoniris make a fresh set of roots at flowering time the plants will grow strongly at once, and be well established before autumn. I have also found that diseased rhizomes, which I pulled up and left lying on the surface of the ground under a light all through the summer, are now growing healthily.

Disease among Bearded Irises.

(" *The Garden* "—*September 7th*, 1918.)

Most gardeners must have noticed from time to time that tufts of leaves or even flowering stems of irises are apt to turn yellow from the base upwards and to come away bodily at the slightest pull. It will then be found that the base is soft and rotten, with a most offensive smell. The disease will be found to have spread more or less to the rhizomes, and, when plants are attacked in all parts of the garden, it would seem as though the whole collection were doomed. Without going deeply into the mysteries of bacteriology, it is perhaps enough to say that the disease is supposed to be caused by a bacillus to which anything acid is fatal. This is the more curious because irises growing in a limestone or chalky soil are, I believe, seldom attacked by the disease, though one would have imagined that, since such soils cannot be acid, the bacillus would thrive in them. Possibly the explanation may lie in the fact that in limestone or chalky soil the irises are so vigorous that they are able to withstand the attacks of the bacillus, which is present in the soil all the time, just as people in robust health live immune though they are daily brought into contact with noxious bacilli. Whether this is the real explanation or not, the fact remains that the disease never spreads very far when superphosphate of lime is scattered over the ground occupied by bearded irises at the rate of one pound to every five or six square yards. Rotten rhizomes should be removed and burnt, and if these precautions are taken it should not be difficult to check the disease.

On the subject of " Disease in Irises " some correspondence was published by " The Gardeners' Chronicle " *in the summer of* 1918. *Mr. Dykes' contribution was as follows* :—

Irises and Disease.

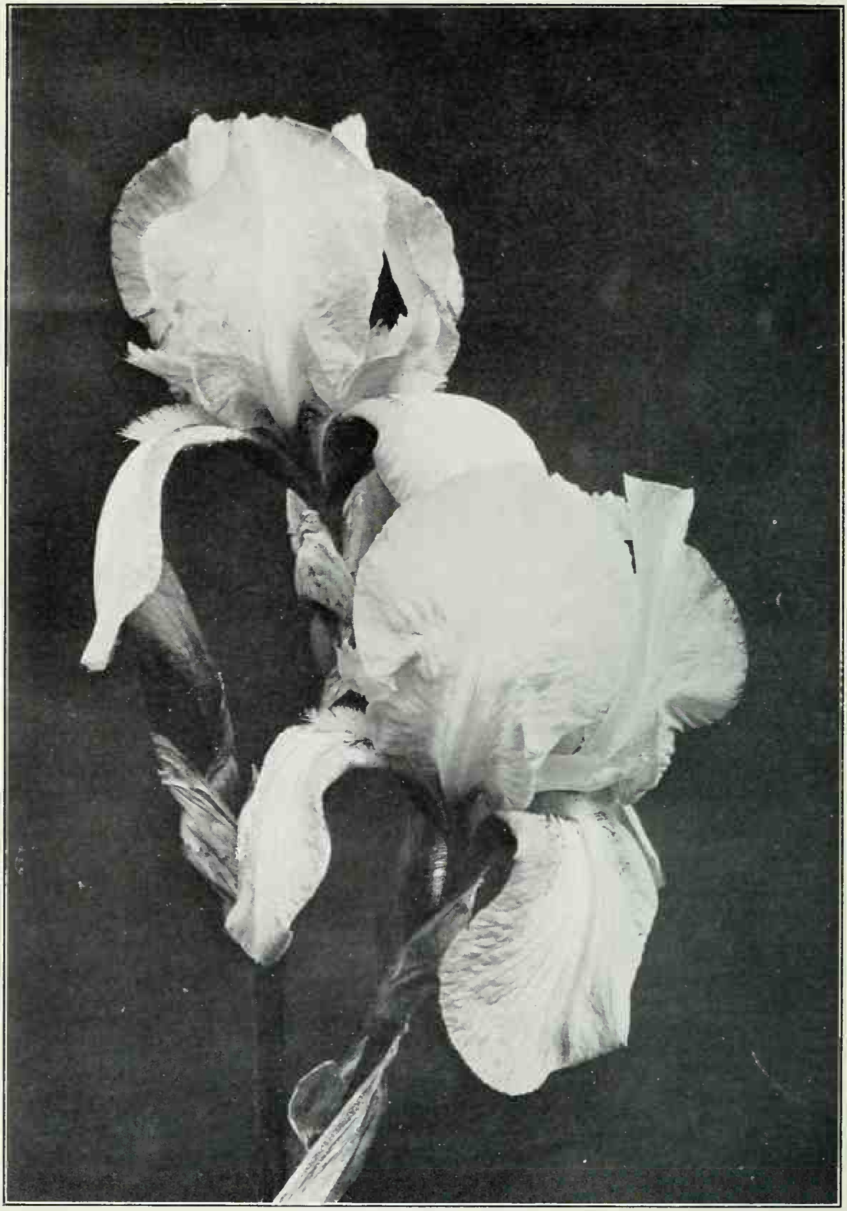
(" *The Gardeners' Chronicle* "—*June* 15*th*, 1918.)

Even at the risk of incurring the title of " faddist," which Mr. Watson bestows on those who transplant rhizomatous irises in summer, I cannot let his remarks, on *p*. 233, pass unchallenged. It has probably been my lot to plant and replant as many kinds of irises in the last ten or fifteen years as most gardeners deal with in a much longer period, and I doubt very much whether it is really " so utterly opposed to nature to dig up rhizomatous irises when in full leaf " as Mr. Watson appears to imagine. If he will dig up a plant that is just going out of flower he will find that the roots attached to the main axis which ends in the flowering stem are brown and withering. Obviously they have done their work in nourishing the stems and the flowers. It is to the lateral growths that we must look for flowers in the following year, and here he will find that root-growth is beginning. There may be young, unbranched fibres a few inches in length, and, besides, there are sure to be a number of points of new roots just pushing out from the rhizome. Surely, then, this is the moment at which transplantation may be carried out without detriment to the plant.

Mr. Watson does not tell us when he would transplant such irises, but presumably he would do it in the autumn or in the early spring. In the former case, root-growth has ceased for the year, and the plants lie in the ground through the winter without taking hold of it, and are often actually lifted out of the soil by frost and thaw, while in the latter case the flowers for the coming season are either entirely sacrificed or at least stunted. I wish Mr. Watson could have seen my garden a week or two ago. There were many beds of irises in full flower, although all the plants in them were transplanted in June, July and August last year. On the other hand, there were a few in which the irises had had to be planted later and in these the plants were stunted and the flower-stems few. For the disease from which apparently the Kew collection is suffering there is a very simple remedy, namely, superphosphate of lime. I must confess that my garden is never entirely free from traces of this disease, but, on the other hand, I think I can truthfully say that it has never yet carried off all my plants of any variety or species. I seem to recollect that I was once told that when the disease first appeared at Kew the beds were dressed with lime. If this is so, it is hardly surprising that no cure was effected, for once the bacillus that does the harm is present, an acid reagent, such as superphosphate, and not the neutralising lime, is required to destroy it. When leaves turn yellow and rhizomes rot, usually at the neck, level with the ground, the diseased portions should be pulled or cut out and superphosphate sprinkled liberally all round and watered in. Within the narrow limits of my garden I am unable to give my plants fresh soil as often as I should like

IRIS KÆMPFERI

See page 8 and index



IRIS CHASSEUR

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to do, but it has become my practice always to dress the surface fairly liberally with superphosphate whenever irises are being transplanted, and so far, at any rate, my collection has not suffered to any appreciable extent.

[*In the summer of* 1921 *an extended correspondence was published by* " The Garden " *on the subject of* " *Lime and Bearded Irises.*" *Opinions were expressed by a number of amateur and trade growers. The most important of Mr. Dykes' contributions is as follows. Readers desirous of referring to this correspondence will find it in the issues of* " The Garden " *for June and July*, 1921.]

. . . . .

Lime and Bearded Irises.

(" *The Garden* "—*July* 16*th*, 1921.)

So far as I know, the facts are these. In limestone districts and in soil that is strongly impregnated with lime, irises do not seem to suffer from rhizome rot. At any rate, I have never seen any signs of it in the limestone countries where I have found irises growing wild nor in those gardens where the soil is chalky. On the other hand, bacteriologists tell us that the bacteria which cause the disease thrive in an alkaline medium but cannot withstand acid. It seems, of course, curious that lime should encourage the bacteria and yet the plants growing in a limestone soil should not be subject to the disease, but this is possibly because lime is so essential to the plants that if there is not plenty in the soil they are unhealthy and, therefore, in our gardens, fall victims to the disease imported with other plants from elsewhere. If Dr. Osburne was able, when he found signs of the disease, to remove every portion of it, then, of course, an application of lime could not spread the disease, but certainly my own experience has been that it is safer to apply in the growing season a dressing of superphosphate of lime, which gives an acid reaction and is, therefore, fatal to the bacteria responsible for the disease. Most growers will agree that the disease is more prevalent in the growing season than in winter, and it is, therefore, safer to apply chalk or lime during the winter and then give superphosphate during the growing season. Basic slag is, of course, beneficial, for it supplies the lime, and phosphate in addition.

*A New Iris Classification.

TROJANA AS A "BRANCHING" INFLUENCE.

("*The Garden*"—*May 1st*, 1920.)

This heading has often appeared of late in the colums of "*The Garden*," though it is not a little misleading, for it appears to refer only to garden hybrids of bearded irises. If this is so, then it seems to follow that colour alone and not affinity to natural species must be the basis of classification, for practically all the taller bearded irises that we grow in our gardens to-day are the offspring, not of species crossed with one another, nor of species crossed with garden hybrids, but of hybrids crossed with one another. I may be mistaken, but my impression is that Mr. Bliss, who has raised so many new garden irises, has worked throughout with hybrids and not with the wild species. When, therefore, he speaks of a plant being of pallida parentage, all he means is that the plant arose as a seedling from plants that look like pallidas. Now it is well known, and, indeed, it is a Mendelian law, that some plants of hybrid origin so closely resemble one of the parents that they may be taken to be identical with that parent and yet, when they are self-fertilised, they show by the different types that occur among the seedlings that they are hybrids containing within them elements of both the original parents. Thus plants that would at first sight be classed as pallidas may contain within them some characters inherited from other species, and I feel sure that this is the case with the widely-branching habit which, if I understand Mr. Bliss rightly, he maintains that pallida shares with trojana.

It would be interesting to know whether Mr. Bliss has ever grown a wild pallida with a widely-branching inflorescence. He admits that he does not know what degree of variation there may be in the wild state and yet he goes on to maintain that "Pallida seedlings and hybrids display the widest range of branching," and disputes Mr. Dillistone's contention that the branching habit is characteristic of the trojana and not of the pallida type. Some years ago it was my good fortune to see growing wild on the eastern side of the Adriatic some thousands of plants of I. pallida, and if there was one thing more than another that struck me with regard to the inflorescence it was that the flowers were crowded together towards the upper end of the stem and that the lateral branches were always short. On the other hand, when I first received direct from the Vienna Botanic Gardens, where the plant was originally described, a number of rhizomes of I. trojana, the chief characteristic of the inflorescence proved to be the widely-branching habit.

These two species, pallida and trojana, differ in another respect that has always seemed to me of the utmost importance in determining the affinity of any bearded irises. As far as my recollection goes there is no known instance of an undoubtedly wild species in which the spathes that enfold the unopened buds are scarious in the upper half and herbaceous in the lower half. It is true that the extreme upper edge and tip are often almost transparent and membranous, but then it is distinctly living and not dead and dry as in I. pallida. Or, again, the spathes may not be wholly green, but much flushed with purple, as in I. trojana or in many of the numerous local forms of I. aphylla. Of the European species, pumila, mellita (chamaeiris), Reichenbachii, sub-biflora, pseudo-pumila, aphylla and variegata all have herbaceous spathes in some cases more or less flushed with purple, while pallida forms the only exception with entirely dry and scarious spathes. No mention is made of the so-called I. germanica because there are at least two good reasons for believing it to be of hybrid origin beside the fact that its spathes are half scarious and half herbaceous. Of these reasons the first is that, whereas all the above-mentioned species set seed readily when cross-pollinated in this country, I. germanica can seldom be induced to set any sound seeds at all. Pods sometimes form, but these usually wither away while still immature, or else contain no sound seeds when they are fully ripe, or at the most only one or two. The second reason is that from such seeds as have been obtained from the various forms of I. germanica no plant has been raised that might be described as a typical germanica.

To these European species must be added I. trojana, which is probably a wild species, though nothing more is known of its origin than that it was brought from the neighbourhood of Troy to the Vienna Botanic Garden some forty or fifty years ago. We have then enumerated all the species that underlie our tall bearded irises, namely, pallida, variegata, aphylla and trojana. Possibly we ought to add some other unknown species, which gave rise to the various forms of germanica when crossed with I. aphylla, but this is doubtful, since "germanicas" may be the result of the cross-fertilisation of pallida and aphylla, although in this case we should scarcely have expected them to retain their foliage in winter or to be so liable to damage by late frosts as are such forms as atropurpurea, of which large clumps are often flowerless because the buds succumb to the frost when they are still hidden away at the base of the shoots.

Another character that may help us to recognise the hybrid character of a bearded iris is found in the peculiar texture of the leaves of I. variegata. These are always thin and very strongly ribbed, and when this character occurs we may feel fairly certain that there is some variegata in its ancestry. Thus flavescens is akin to variegata, but it is not pure variegata, for the spathes are not wholly green as they are in that species. Black Prince, by its foliage, is another variegata and this is confirmed by the fact that seeds obtained by self-fertilisation do give a number of variegatas. No other European species has such strongly-ribbed foliage as variegata, for a parallel to which it is necessary to go far away to the Chinese I. tectorum.

It must also be remembered that the branching habit of the inflorescence is not confined to I. trojana, but is also found in I. variegata and to a still more marked degree in I. aphylla, where the stem often branches at the ground-line.

If we now go through a number of our garden bearded irises, we shall find that the characters we have discussed have become confused and sometimes been rearranged in fresh combinations in such a way that it is impossible in many cases to assign a plant to any group of which one of the wild species would be typical. We have, therefore, to fall back upon colour alone as our guiding principle and, indeed, for garden purposes colour is of the utmost importance. Provided that a plant is vigorous and floriferous, the average gardener is not concerned to know whether it is more closely allied to I. pallida than to I. trojana, nor does he care whether it has the green spathes and thin, ribbed foliage of I. variegata or the papery spathes and thick, smooth leaves of I. pallida.

* *As the originator of the discussion that produced this contribution from Mr. Dykes I feel compelled to express the regret that it is not practicable to reproduce the article by Mr. Bliss in conjunction with it. The matter of the influence of trojana to produce the branching habit is now I think beyond dispute. The modern seedling bearded iris has departed so far from the original species that it is often impossible to classify it in relation to any. A fact that is often lost sight of is that the dominant characteristics of a parent several generations back, it being itself a blend, will reproduce themselves in an unexpected manner.*—G.D.

Iris Conference.

(*" The Gardeners' Chronicle "—June 17th,* 1922.)

The Iris Exhibition and Conference, held at Vincent Square, on June 7th and 8th, brought together the best collection of garden varieties of bearded irises that has probably ever been seen in the hall, and also the largest gathering of iris growers and enthusiasts. It was a pleasure to be able to welcome Monsieur S. Mottet, who brought over a number of flowers from MM. Vilmorin's collection at Verrieres, and the President and other members of the American Iris Society, who are fast making up for their late start in the cult of the iris by their tireless energy and abundant enthusiasm. Another welcome visitor was Mr. G. Yeld, whom the younger generation knows as a contemporary of Sir Michael Foster, and who has given us a number of good varieties, such as Lord of June, Sunshine and Dawn,

Irises are difficult flowers to exhibit in good form. It is almost useless to go out into the garden and cut a number of flowering spikes, for it is impossible to carry them to the exhibition without crushing and mangling the flowers beyond recognition. Yet this is possibly the only method of dealing with large numbers of varieties and stems. Another drawback of the method is that the flowers which develop later from buds are always undersized when they open after the stems have been cut some forty-eight hours or even longer. There is another and somewhat laborious method, which is to choose only stems on which fully-developed buds are about to open and to tie these buds with wool before cutting the stems. These can then be packed much more closely and the buds should open into perfect flowers as soon as the wool is cut, when the stems are placed in water on their arrival. It is best to cut the stems in the late afternoon, and to put them in water for some hours before they are packed for the journey.

In one way the whole meeting was disappointing. It seemed to be taken for granted that irises mean only tall bearded irises of the Pogoniris section. Irises of other sections of the genus are little known and little grown, but, if an iris show becomes an annual event, it might be well worth while to include a class for species either of the Pogoniris or of other sections.

On this occasion the prizes were nearly all won either by Messrs. Wallace & Co., of Tunbridge Wells, or by Mr. Bliss, whose flowers came from their gardens. The late date fixed for the show and the fact that their irises are grown on a north slope, no doubt eliminated several possible competitors, and for the group of twelve varieties, staged for the silver medal of the American Iris Society, Messrs. Wallace were very nearly defeated by Mr. Baker, whose spikes of Lord of June and Asia were better than anything shown from Tunbridge Wells.

Mr. Bliss' winning varieties were Bruno, a large flower of considerable substance—indoors the colour is a dull, murky combination of brown and purple, but sunshine lights it up, and it then becomes a much-improved Prosper Laugier—Duke of Bedford and Swazi, both of a dark blue-purple shade with five large flowers of much substance, better distributed on a taller stem than the much-lauded Dominion, and Citronella, a large flower with pale yellow standards and dark reddish-purple falls edged with yellow. Seen in the distance, this last is a fine addition to the numerous variegatas which we already possess, but, when closely examined, it is seen to possess a central line of yellow, running down the red-purple of the fall, which, as one spectator expressed it, was as disfiguring as a hare lip in an individual.

All iris raisers are striving to produce a tall variety with clear yellow flowers. A distinct advance in this direction was shown by Chasseur, one of the varieties brought over by Monsieur Mottet. In this the yellow colour is brighter at the edges of the flower than in the centre, but the variety has hardly the tall stature which is desirable if a yellow is to appear side by side with such fine things as the dark blue Duke of Bedford and Swazi, or the purple Ambassadeur and Cardinal.

Those who judge irises at a show or in a large collection in nursery beds are rather apt to lose sight of the fact that not all irises must be tall or dwarf at the same point of the iris season. In garden borders we need a gradation in height from the front to the back of the border, and this lends additional value to the tall variety of early-flowering habit and also creates a need for varieties of dwarf or moderate stature which flower late in the season.

It was to help amateurs to arrange irises in their gardens that the R.H.S. attempted to classify the garden varieties according to colour and published a preliminary draft of the proposed classification in the latest number of the Journal. This classification rightly ignores the botanical affinities of the various varieties, for much hybridisation has now obscured the original species and mixed the characteristic features.

The authors of the classification have also wisely decided not to become involved in disputes as to whether a colour is lilac, lavender, pale violet or mauve, and have confined themselves to blue-purple and red-purple, qualified when necessary by the addition of light or dark.

On the occasion of the Conference, all obtainable varieties of bearded irises were arranged round two sides of the hall in accordance with this classification. The series began with the whites, of which the well-known albicans may be taken as the type, and went on through such flowers as Madame Chereau and Parisiana, where the white ground is covered either merely at the edges or nearly all over by veinings and dottings of blue or red-purple, to those varieties where the standards are white, or nearly so, and the falls purple. The authors of the scheme of classification had originally attempted in the former case to separate those varieties in which the feathering appears only at the edge from those in which the colour is suffused over the whole flower, and in the latter to draw a distinction between those varieties in which the veins on the falls remain distinct and those in which they run together so that the colour is suffused over the whole surface. When the varieties were placed side by side, it was found impossible to draw these distinctions with any certainty and they were therefore abandoned.

Next in the scheme to those varieties with white standards come the purple bicolours with standards paler than the falls, and then the purple selfs, among which are to be found the great majority of the forms of I. pallida.

Then come those varieties in which the yellow of I. variegata begins to make itself felt, though it may be as little apparent as it is in Isoline or as obvious as in Iris King. The various varieties of I. variegata come next and these pass naturally into the yellow of Mrs. Neubronner and the cream of flavescens and Dawn, which complete the circle and bring us back again to the whites with which we began.

When the list is eventually published all the best-known varieties will be fitted into this scheme, and details will also be given as to the height of the stem and the time of flowering. If this proves successful and useful, it should be possible, at the end of each season, to publish a supplementary list allotting to each new variety its appropriate place in the classification.

At the present the best varieties are mainly of English origin, though a few years ago those sent out by Messrs. Vilmorin-Andrieux & Co., attracted most attention. Unless the number of raisers in this country increases, it seems as though America must soon take the lead, for there the growers are already raising seedlings by the thousand, and when they do this with our best varieties as seed parents and pollen-parents they are bound to obtain some good results. The raising of seedlings is a fascinating pursuit, and really it is not tedious. Seeds ripened one year should, in the majority of cases, germinate the next, and, if the young plants are properly treated, a fair proportion of them may be expected to flower in the following year. Then comes the really difficult task, for to some, all geese are swans, and yet in reality the swans are few and must tend to be ever fewer in years to come.

Most raisers have a bias, conscious or unconscious, in some one direction. Some aim at uniform colour, others at the shot or smoky shades which seem to be so popular in France. Let us hope that this divergence of tastes will save the iris from the awful fate of becoming a florist's flower, when it would have to conform to some set of arbitrary and rigid rules. Irises are garden plants. They must have sun if they are to be healthy and to display the colours of their flowers. These colours are seldom seen to advantage in a room, and never in the gloomy yellow light that filters through the canvas of tents.

The R.H.S. Classification of Garden Irises.

(" *The Garden* "—*December* 31*st*, 1921.)

The Royal Horticultural Society now has in the press the outline of the classification of garden bearded irises which has been drawn up by a committee of experts. The classification is intended entirely for garden purposes and is based primarily on colour, but will also allow of additional details with regard to height and time of flowering. On Wednesday and Thursday, June 7th and 8th, 1922, a special iris meeting will be held at Vincent Square, when it is hoped to be able to arrange in order all the varieties given as specimens in the classification. At this meeting there will be special competitions for iris seedlings, for which cups have been generously promised to the Society by Messrs. R. W. Wallace & Co., of Tunbridge Wells, Messrs. Whitelegg & Co., of Chislehurst and Mr. Amos Perry, of Enfield. In conjunction with this meeting there will be held an informal conference at which the classification will be discussed and at which it is hoped to have the collaboration of French and American growers. The Societé Nationale d'Horticulture is also arranging a series of meetings in Paris, and it is hoped that English experts will be able to attend the chief meeting on May 27th, when the French scheme for classification is to be discussed. It is hoped that by cordial collaboration between our allies and ourselves unanimity will be reached and a classification drawn up the result of which will prove acceptable to growers in all countries.

Introduction to "Iris Society Bulletin" No. 1.

(*November*, 1924.)

In putting before the members of the Iris Society, and of the public, these four papers by experts on the cultivation of bearded irises, I feel that attention ought once more to be drawn to the fact that there are other irises than bearded irises, and that there are among them many beautiful garden plants, which are in danger of being neglected. When we remember that our garden bearded irises have been derived by hybridisation from some half a dozen wild species, and that there are at least one hundred and sixty species, and probably more, in the whole genus, we shall realise how slight our acquaintance with irises will be if we confine our attention to the bearded irises of garden origin.

Even the bearded species are very commonly neglected and seldom seen in our gardens. How often, for instance, do we see the real Iris pumila, though it is capable of producing such masses of flowers as almost to hide its foliage? Iris aphylla, too, in its many wild forms will give us flowers of every shade of purple as well as of white, pale yellow and pearly grey, and, moreover, some of its forms will flower a second time in the autumn although they have already bloomed in April and early May.

It is hard to understand this neglect of the wild species, for it is with their help alone that the hybridiser is now likely to obtain striking novelties among garden bearded irises. Thus I. Alberti, an early-flowering species from Turkestan, is capable, when combined with I. pallida, of giving us tall, early-flowering hybrids which stand out above all other varieties in bloom at that period of the season. I. Alberti passes on its early-flowering habit and its colour, while size of flower can easily be supplied by our garden hybrids.

Roughly speaking, and unless we are willing to make or re-make the soil of our gardens on an extensive scale, the irises which we shall grow are determined for us by the soil and situation in which we garden. Where the soil is heavy and yet well drained, the Spuria section, which contains such good garden plants as I. ochroleuca and I. aurea, should do well, while I. graminea, which is by no means fastidious as to soil, should be grown by everyone who appreciates a finely-scented flower.

I. sibirica and its beautiful Chinese relatives, such as I. Delavayi, I. Forrestii and I. chrysographes, do best in a cool soil, rich in humus. They will also do well at the edge of ponds, though they seem to prefer not to be too wet in winter. The same applies to I. Kaempferi, of which the hybrid forms are so well known as Japanese Irises. They are distinctly not water plants, if by that we mean a plant which stands in water throughout the year. I. Kaempferi likes to be wet during the growing season and comparatively dry in winter.

On the other hand, I. laevigata, the deep blue-purple type, its albino pure white variety, and the purple-spotted albo-purpurea are real bog plants, and so are also our native I. pseudacorus and its American cousin, I. versicolor. These three species seem to form a closely related group, if we may judge by their seeds, which are practically indistinguishable.

In rather light, rich soil, where no appreciable amount of lime is present, a very attractive bed can be made by planting seedlings of some of the Californian species. None of these irises likes being moved, though the plants can be divided and replanted in spring when growth is active. They do best when they are planted out as seedlings some four or five inches high, if possible in May, and in any case before mid-summer. If they are kept too long in the seed pots, they have no time to grow to sufficient size to withstand the winter, and it is equally a mistake to let them spend the winter crowded together in the seed pots. The easiest and most variable species are I. Douglasiana and I. tenax, and of these hardly any two seedlings are exactly alike.

I. longipetala is another Californian iris, but this will thrive in the heavier soil of any good garden border, and it is a plant that deserves to be more widely known and grown than appears to be the case at present.

Bulbous irises, with one exception, like a warm, dry soil and a thorough rest in summer. The exception is I. xiphioides, the misnamed English Iris, which comes from the wet alpine meadows of the Pyrenees, and which is never happy except in cool, moist soil.

All irises like sun, and the vast majority must have it if they are to flower freely. Our native I. foetidissima, will, however, flourish in woodland and even flower sparsely, and some small species, such as the tiny Japanese I. gracilipes and the American I. cristata and I. lacustris, seem to prefer half shade, but it is a mistake to suppose that irises will flourish and flower in any dark sunless corner of the garden, where all the nourishment is sucked from the soil beneath the rhizomes by the greedy roots of overhanging trees.

A Suggestion to Members of the Iris Society.

("*Iris Society Bulletin,"—April 30th,* 1925.)

A suggestion was put forward on my behalf at the last meeting of the Society and in principle approved. I have since been asked to explain my proposals in this "*Bulletin*" to all members of the Society.

Comparatively few of us realise that hitherto our Society has confined its attention to the hybrids that have been raised from some half a dozen of the one hundred and seventy odd species, which, as far as we know, constitute the Iris genus. This narrow view is surely unworthy of a society whose aim is to help all garden lovers.

At present the resources of the Society cannot maintain a trial ground of our own, and even if a complete collection of the species could be gathered together at Wisley, it would necessarily be so scattered that visitors would fail to find many of their favourites.

My suggestion is that as many of the members of the Society as possible should each undertake to grow one or two or half a dozen of the wild species and make himself responsible for them. He would endeavour to obtain a few seeds of each species every year, and these seeds would be available to other members of the Society. Each of us would know who was responsible for each species, and if we came across any unusual varieties or got wild seeds of it from abroad, we should at any rate share them with the member who was responsible.

For instance A, who had a dry, sunny garden and sheltering walls, might undertake to collect all forms of I. unguicularis, while B, who had a deep soil rich in humus in a cooler situation, would make himself responsible for I. sibirica, I. orientalis, I. laevigata or I. Kaempferi.

Years ago now I set out to raise from seeds and to grow every available species, and my experience taught me two things at least. One was that by persevering enterprise it is nearly always possible to get into touch with someone in or near the native home of a species who will send seeds or plants.

The second discovery was that in light, non-calcareous soil it is possible to cultivate and flower nearly all the available species. I do not mean that the man who gardens on the top of several hundred feet of sandstone rock should undertake such species as I. laevigata or I. Kaempferi, though even these species are not impossible in such a garden.

The localities in which each species grows wild are available to anyone who will examine the iris specimens in the herbarium collections of the various museums, and are to some extent collected ready for them in "*The Genus Iris.*"

There is, of course, no reason why two or three members should not all make themselves responsible for the same species, for it is always interesting and generally profitable to be able to compare notes. There is also, of course, no reason why anyone should not grow any species which appeal to him, even if he does not want to be officially responsible for them.

The merits of the scheme as I see them are that in a few years there ought to be in existence a very extensive collection of nearly all the species, which would be immediately available if at any time the Society saw its way to establish a real iris garden, and, even if this ideal could not be realised, species would be readily available which at present are almost unprocurable, even if they are not unknown entirely in cultivation.

If those who are willing to take part in the scheme will write to me and let me know which species they will undertake, a start can soon be made and a list of those responsible for the various species published in the next "*Bulletin.*"

Iris Sibirica and its Relatives.

(" *The Garden*"—*July 23rd*, 1921.)

That the plant which we now know as Iris sibirica should have received this name is doubtless due to some confusion among the early botanical authorities, for there is little doubt that the plant is really a native of Europe, throughout the centre of which it occurs, from near the French coast on the Bay of Biscay, across the Rhine to Bavaria, Switzerland and Russia. The first undoubted description of it is found in Clusius' " *History of Pannonian Plants*," and it was on this description, as quoted by Bauhin, that Clusius based his account. The characteristics of the species are the tall, hollow stems, which bear the flowers high above the leaves, the small scarious spathes and the short, broad, rounded capsules containing large flat seeds. No plant with these characteristics seems to be known in northern Asia, though it is not impossible that it may exist in the Altai region, where one or two other Hungarian irises are also known to occur. The Asiatic species is I. orientalis, and is distinguished by its relatively shorter stem, which does not raise the flowers much above the leaves, by the herbaceous and often reddish spathes and by the longer and more acutely-angled capsules, which contain small cubical seeds. Its home is east of Lake Baikal and extends to Manchuria, Korea and Japan. The well-known Snow Queen is an albino form of this species, but the distinction between sibirica and orientalis has almost become obliterated in our gardens, where the best forms are often hybrids between the two, combining the large flowers of orientalis with the tall stems of sibirica. Each species has a white form and though these white forms breed true when self-fertilised, all shades of light blue and even pale greyish-mauve can be obtained by crossing white and purple forms.

If we take the hollow stem as being characteristic of all the species of the sibirica group, then, with the exception of the two plants we have already described, the home of the group is in south-western China, from which come two yellow species—I. Wilsoni and I. Forrestii, also I. chrysographes and I. Delavayi. I. Forrestii is a plant found on the open mountain pastures in north-west Yunnan and sends up a number of slender stems to a height of about eighteen inches or two feet above the narrow, glossy foliage which serves as a pleasing background to the delicate, pale-yellow flowers. I. Wilsoni comes from western Hupeh and Shensi and is a sturdier plant than I. Forrestii, though the yellow flowers are hardly so pleasing, because they are veined with faint purple veins.

The most recently-discovered member of the group is I. chrysographes, which, in its best form, well deserves its name, for there is a conspicuous network of gold lines on the blade of the falls. The colour is of the richest deep red-purple and the standards spread outwards to give the flower a most graceful outline. I. chrysographes varies a good deal from seed, and in some forms the gold markings are reduced to a single yellow streak down the centre of the blade. The remaining species of the group is I. Delavayi, which deserves to be far more widely grown than it usually is. It is essentially a plant for the waterside or for the bog garden, where its stems will reach to a height of quite five feet, and where it will flower freely in a sunny position. Some years ago there seemed to be in cultivation in this country only one variety of this iris, a dark red-purple form with a conspicuous white blotch on the falls. A few years ago, however, I received some seeds from Western China which have produced a number of colour forms. The flowers of each individual plant are of a different shade of blue-purple or red-purple and the amount of white veining and the number of white blotches vary in each example.

The other species which has been included in the sibirica group is I. Bulleyana (from western China), which seems to be of hybrid origin, since it does not breed true from seed. Its parents, however, are unknown and there is no suggestion as to the species which could have given rise to it. The Himalayan representative of this group is I. Clarkei, but it is distinguished from all others by its solid stem. The original specimens came from the ridge of Tonglo, some ten miles from Darjeeling, where there are a number of colour forms, for specimens collected some years ago over a distance of thirty miles showed variations in nearly every case. This iris also appears to spread northwards into the Chumbi Valley and is possibly the iris seen recently by the Mount Everest expedition on its march through Tibet.

In America there is a closely-allied species called prismatica, with a solid stem which, in this case, is extremely wiry and slender. It is a graceful little species, with flowers not unlike those of a small sibirica, though its habit is different, for it comes up in rather widely separated tufts instead of in dense masses.

That I. Clarkei and I. prismatica are less closely related than the other members of the group is shown, perhaps, by the fact that they will not hybridise readily with them. The other species can all be bred together, and it is possible to obtain both sibirica and Delavayi in which the white ground is replaced by the yellow which comes from I. Wilsoni. The amount of gold marking on I. chrysographes can also be increased by crossing that species with I. Forrestii, but as the hybrids lose something of the velvety richness of I. chrysographes, it is doubtful whether the hybrids are worth making, except as a test of affinity between the species. I. sibirica crossed with I. orientalis is sometimes entirely sterile, as is also I. sibirica crossed with I. Wilsoni. On the other hand, I. Delavayi crossed I. Wilsoni and I. chrysographes crossed I. Forrestii produce hybrids which seed freely. The latter cross especially gave rise to a whole series of curious mongrel forms. An exceptionally dry summer and the difficulties of gardening under war conditions put an end to most of these and it is doubtful whether it is worth while raising them again, for few of them are as pleasing as the original species. An exception must, perhaps, be made for I. Delavayi crossed Wilsoni, which is a very handsome and vigorous plant.

All irises of the sibirica group seem to do best in an open soil rich in vegetable humus and abundantly supplied with moisture. They do well at the margin of ponds and streams, though Forrestii deserves a choicer place than this. The roots form a dense mat and penetrate the ground to a considerable depth, with the result that it is practically impossible to transplant a good-sized specimen without checking it considerably. In all but the rainiest seasons it is, for this reason, inadvisable to attempt to move the plants until late in September or early in October and even then it is usually a year or two before the transplanted plants form such good specimens as they were in their original position. The best effects are often obtained by planting out young seedling plants in the positions where they are to flower and, if this is done early in the season and the plants are generously treated in the matter of water and humus, they should begin to flower in the following season and become large plants by the second year. Seedlings of these species are easily raised. All that is necessary is to sow the seed thinly in pots of rich, light soil, well drained and containing plenty of sifted leaf soil and to cover the seeds with a bare half-inch of soil. The pots should then be plunged to the rim in sand or ashes in the open and merely protected from the depredations of birds and other intruders by some arrangement of wire netting. No protection from frost is necessary, for its effects seem rather to be beneficial. Early in the year a sharp look-out should be kept for the tiny green points which begin to make their way through the soil in March or April, according to the season and it is then that the protection of a cold frame or a temperate house is beneficial to the young plants. There they are not checked by late frosts and the more rapidly they can be grown on, the sooner they will be ready to be planted out, with a better chance of growing into flowering plants by the succeeding year.

Some Irises of Hérault.

(" *Revue Horticole* " (*France*)—1912.)

I was urged recently to write a short note on the irises of Hérault. I gladly accept this opportunity of suggesting to local botanists and to lovers of the local flora some questions on the iris which seem to me to have a certain interest.

Let us start with the Pogoniris, the irises with bearded falls, of which one only, I. chamaeiris, is indigenous to the department. This plant is found here and there throughout the waste lands. The colour of the flowers varies a good deal, for there are white forms and yellows and purples in all shades. What is most extraordinary is that in certain places we find only plants with yellow flowers ; in others there exist only purple-flowered forms, while in some all colours are found. This fact has given rise to several synonyms, as for example I. lutescens of Lamarck.

Among the herbarium specimens of this species we find a great deal of difference in the size of the different individuals. Still this difference can be explained if we take account of the different conditions of soil and climate under which these plants grew. Thus for example I gathered among the bushes at the base of Mt. Majour an Iris chamaeiris which had at least a height of twenty-five centimeters, while higher up on the rock itself I found another which was but ten centimeters. When I grew them side by side in my garden, they flowered at the same time the following year, both with a stem of fifteen centimeters high. They were in fact identical.

In our gardens, and particularly in catalogues, this Iris chamaeiris is confused with I. pumila. This last is indigenous to Austria, Hungary and the south of Russia, but is not found in the wild state in any part of France. Further, it conforms to the habit of all the irises of Central Europe, that is to say of the regions where bad frost prevails in winter, for it loses its leaves in autumn and lies dormant until spring. On the other hand the leaves of I. chamaeiris make autumn growth and the plant suffers a good deal from cold even in England in our relatively mild winters. Other instances are I. aphylla and I. variegata, which, having lost their leaves in autumn, withstand the coldest winters, while I. germanica, which keeps its leaves in winter and cannot as a consequence be a German plant, is often damaged by frost in winter and not infrequently is rendered flowerless by spring frosts.

The origin of I. germanica still remains obscure. All that is certain is that it does not merit its name. It is rather a plant of the Mediterranean region, or even of a still more southern country. To-day it is not found in a wild state but always in places which have been cultivated at a more or less distant epoch. Thanks to its extraordinary vitality it can be carried anywhere. Living specimens have shown me that the variety atropurpurea which is found in the gardens of Hérault and especially close to the Chateau of Saint-Louis at Beaucaire is also the most common iris at Khatmandu in Nepal where it is is described by Wallich under the name of I. nepalensis. Further, the variety Kharput which is quite common in our gardens and which comes from the place of that name in Asia Minor grows also in enormous masses at Srinagar in Kashmir. Have these irises been taken from the West to the Orient or do they come from the Orient? Comparison with Himalayan species leads us to believe that they are rather plants of a region where the winters are relatively mild, like the shores of the Mediterranean.

While making, several years ago, a brief stay in the Midi I heard that I. florentina was found by thousands at Les Onglous. I went there to see them on the spot, and I was able to convince myself that they were not I. florentina but I. albicans, Lange. These two irises have a rather curious history and have given rise to endless confusion. Linnaeus himself started this confusion, for in describing I. florentina, he cited a plate of I. ochroleuca, although he speaks at the same time of a bearded iris. If we take as the type of the species florentina the plant of the "*Botanical Magazine, pl.* 671 (1803), we shall find that it is an iris with white flowers with a slight blue tint. The spathes are almost altogether scarious at the time of flowering, and there are always a few hairs on the concave surface at the base of the standards. This plant has quite the appearance of a germanica, and in fact it is an albino germanica of which there are several forms. For example, the variety atropurpurea has a form with white flowers and happily I have succeeded in finding the form with purple flowers of which the so-called Iris florentina is the albino. Several years ago I had sent from Florence itself some rhizomes which are used to make orris powder. Among these plants there were pallidas and germanicas, of which one, with purple flowers and slender stems, had all the characteristics apart from colour of I. florentina.

It is now a question of discovering the origin of I. albicans, which grows by the million in the sand among the vines at Les Onglous. I. albicans was found by Lange in the neighbourhood of Almeria in Spain and has been grown in our garden for at least fifty years. Moreover the late Sir Michael Foster and others have received from different places specimens of this iris. They have come from Sicily, from Cyprus, from Asia Minor and even from Persia. In fact it is found everywhere where the Moors have settled and particularly in Mohammedan graveyards.

Ten years ago there was introduced from Arabia under the name Madonna an iris with blue flowers. When this flowered in my garden I was struck by its resemblance to I. albicans. Several months later while working in the herbarium of the Jardin des Plantes at Paris I found specimens of an iris gathered in Yemen by Botta in 1837. Some were white and some blue, and it is not difficult to see that the Mohammedans used this white iris to decorate their cemeteries and that they carried it everywhere with them, in Spain, in Sicily, in Asia Minor.

Let us now pass on to another species of iris, I. spuria, which presents very great difficulties to the botanist. It is spread under its different forms from Spain and Algeria as far as Kashmir. The Austrian botanists have tried to prove that the Austrian variety can be distinguished from the French variety, because in it the leaves on the stem are short and allow the internodes to be seen, while in the other the leaves are longer than the internodes which they consequently entirely hide. They have claimed that the plant with long leaves, coming from the neighbourhood of Montpellier and Hyères, was I. spathulata, Lamarck, while to the other they gave the name of I. sub-barbata, Joo.

Now at the mouth of the Hérault there is, or perhaps one ought to say there was several years ago, for I looked for it in vain this year, (a) a form of I. spuria of which a friend got me a specimen. This plant has flowered with me side by side with another which I gathered myself in the marshes between Hyères and the sea, and with a third which represented the Austrian variety. Now the plant from the neighbourhood of Agde had the short leaves on the stem which the Austrians claimed for their variety. It was altogether different from that from Hyères.

Another curious comparison ! Chamaeiris, pumila and spuria are represented in the Balkans by three others, Reichenbachii, mellita, and Sintenisii. I. chamaeiris differs from I. pumila by the perianth tube which is only twice as long as the ovary, while in I. pumila the tube is four or even six times as long as the ovary. In I. chamaeiris the stem is always apparent, in I. pumila it hardly exists. The two species Reichenbachii and mellita have exactly the same differences. but while the former have tubular spathes (b), the spathes of the latter have a strongly pronounced keel. What is still more striking is that there is the same difference between I. spuria and I. Sintenisii. But why have the irises of the Balkans this keel ?

Finally it must be said that this year we have been able to prove that I. xiphium still exists between Roquehaute and the sea. It was in full flower on July 1st, rather a late date for this species. The horticultural varieties flower in our gardens in May—June, and one did not expect to find it in bloom at the beginning of July. However we must remember I. serotina of Willkoam, which he found in full flower in autumn.

I found also in the herbarium at Edinburgh specimens gathered by Reverchon in the month of August and even in September on the Sierras of Cazorla and Pinar. I grow also an Iris Taitii, coming from Portugal, which flowered in the middle of the month of July and which is only a variety of I. xiphium. What are the conditions which cause them to flower at so late a date ? We do not know.

(a) At the time of my visit they had recently cut the hay, and it is quite possible that the iris is still there (Dykes). It has since been re-discovered by M. Lannes (Denis). According to M. Cadol it is found also at Salinas de Villeneuve.

(b) There sometimes exists in the chamaeiris a slight trace of keel on one of the spathes but it is never strongly marked on both.

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